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STEEL is published every Monday by PENTON PUBLISHING CO., Penton Building, Cleveland, O. JOHN A. PENTON, *Chairman of the Board;* C. J. STARK, *President;* J. D. PEASE, *Vice President;* F. V. COLE, *Secretary.*

Member Associated Business Papers Inc. and National Publishers Association. Branch Offices: New York, 220 Broadway; Chicago, Peoples Gas building; Pittsburgh, Oliver building; San Francisco, Claus Spreckels building, 703 Market street; Washington, National Press building; Cincinnati, Schmidt building; London, Caxton House, Westminster, S. W. 1; Berlin, Lichterfeld-West, Dahlmerstrasse, 64a, Germany. Subscription in the United States, Cuba and Mexico, one year $4, two years $6; in Canada one year $6.60, two years $11.20; in Great Britain and European countries £2:2:0, one year.

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Case No. 2808**

In Foundry Operation

A foundry formerly remelted and recast broken foundry flasks. Repair by bronze-welding now makes possible a $60,000 annual saving on this item alone.

Case No. 2457**

In Steel Plants

Oxwelding and machining worn manganese steel coupling boxes cost $50. Formerly rough castings were bought at $75, and finishing cost $50. They saved $75 on each reclaimed box. Case No. 2840**

In Lumber Mills

A lumber concern in the Northwest saved a replacement cost of $2,000 when a large cast-iron Diesel engine base fractured. Although it was badly broken, a Linde service operator supervised repair by oxwelding, without dismantling. Repair cost only a small fraction of the cost of replacement.

Case No. 3989**

In Making Explosives

An explosives manufacturing plant scrapped a $500 steam jacketed kettle, when a crack developed around the bottom. It was repaired quickly by bronze-welding and remained tight when subjected to a hydrostatic test of 40 lb. per sq. in. pressure, which was twice the normal working pressure of the kettle. Case No. 4030**

In Purifying Salt

Bronze-welding a 30,000-lb. rocker arm on a vacuum pump cost a salt manufacturing plant less than $100. Since the estimated replacement cost was $1,000, bronze-welding effected a 90 per cent saving and did a perfect repair job. Case No. 5105**

In Rock Crushing

In a rock products plant, oxwelding and cutting put a fractured rock crusher bowl into condition at a saving of over $2,000.

Case No. 4180**

In Refrigeration

In an ice plant, a twenty-two year old compressor cylinder required a special casting for replacement. The old cylinder was repaired by oxwelding in 36 hr. at a fraction of the cost of a new casting.

Case No. 4090**

In Coal Mines

Accidental overloading of a hoisting engine in a coal mine, caused a bad fracture of the engine bed and cracked the crosshead bearings. The casting weighed 17,500 lb. and involved 28 lin. ft. of bronze-welding. Three welders completed the actual welding in about three hours. Total cost, including materials, labor and overhead, amounted to only 20 per cent of the replacement cost of the casting. Case No. 3710**

In Textile Mills

A broken steam engine cylinder in a New England textile mill put the entire plant out of operation. The model was obsolete and the plans had been destroyed, so that the cylinder was irreplaceable. Bronze-welding solved the problem of repairing the 4-ton cylinder. The job was completed in 24 hours at less than ⅛ of the original cost of the cylinder. Case No. 3813**

**If any of these savings are applicable to your plant and you want additional details, refer the case number to the nearest Linde District Office. If these savings suggest that oxwelding can profitably reclaim worn or broken parts for you too, the vast experience of The Linde Air Products Company in the development and application of the oxy-acetylene process is available to you. Write or 'phone today.

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Volume 92 Number 12

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

CONVERTING sentiment into tonnage now becomes the task before iron and steel. The shakeout of the banking situation followed by boiling stock and commodity markets and universal expressions of confidence are a tonic after almost four years of grinding depression, but they connote victory after the enemy—economic disorder—was practically spent. Only a battle has been won; the war for vigorous recovery remains to be waged; the tactics of a Grant, not a McClellan, are needed.

Iron and Steel Ready for Starting Whistle

And iron and steel is ready, if the pamphlet report of the United States Steel Corp. for 1932 pictures the industry (p. 19). Unprecedented as its deficit was, the Corporation reduced inventories, effected co-ordinations and consolidations in anticipation of improvement, spent generously to keep inactive plants prepared. . . . National Steel, sixth largest producer, not only wrote off depreciation the equal of twice its net profit (p. 19) but also reduced its funded debt and increased its cash.

Industry's Record Sixfold Better Than Bankers'

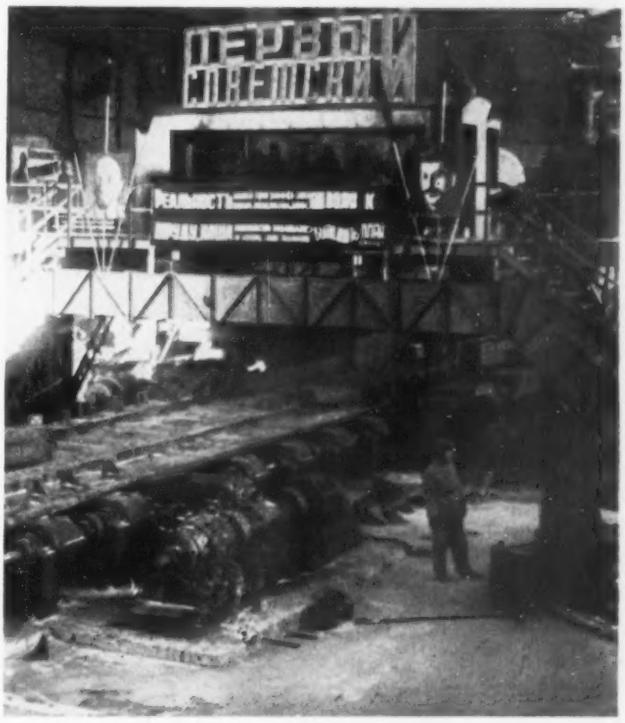
Gray and dull as is the record of industry it has a luster compared with the showing of bankers at whose feet it is supposed to sit (p. 20). Last year only 28,733 or 1.36 per cent of the country's 2,122,845 commercial establishments failed, but the wreckage among banks included 1453 or 7.58 per cent of the total of 19,163. Considering that almost anyone may set up a business, the contrast is the more unfavorable to the banks.

Today's Stockholders Buy Tomorrow's Coal

Alert to the drain of idle capacity in subnormal years, iron and steel is scrutinizing every operation and investment, including so-called captive mines (p. 13). An apparent necessity during and immediately after the war, when the supply of fuel was uncertain, company mines appear no longer required to insure regular delivery and satisfactory quality. As with iron ore reserves, insurance for decades ahead may be an unfair tax upon today's operations. . . . Electricity as a fuel or source of heat becomes more important with the development of induction heating (p. 23) of solids for heat treating, including stacks of sheets for annealing, lengths of pipe or localized portions, or magnetic solids.

Markets Responsive; More Forward Inquiry

Admittedly, insufficient time has elapsed for the iron and steel markets to feel any appreciable impulse from restored confidence (p.



For proving their worth in building this blooming mill at the Makeyeka works in the Donbas region of Russia the Ramsin group of "secret saboteurs" escaped the death penalty, so the caption states. Lenin and Stalin look down approvingly. Photo by Soyusphoto

35) but steelmaking operations have regained the ground lost a week ago, many consumers are seeking protection the farthest ahead in months, barometic scrap prices are stronger.... Efforts to regain a remunerative basis for prices are encouraged by the United States Supreme Court decision in the coal pool case (p. 11), indicating a more liberal antitrust attitude.

Three-Cornered Steel Struggle at Detroit?

In rebounding to 15 per cent, steelworks operations have been supported largely by the release of suspended automotive specifications. Detroit, emerging from the black hole of its banking, is coming back, production is being resumed, improvement in other districts is generating improvement (p. 15). . . . Reports of a titanic contest between steelmakers for Detroit's business, with two contemplating local plants (p. 16), persist. . . . Junk automobiles, stripped of bodies and dumped alongside stone jetties (p. 27), serve to protect beaches from being washed away. . . . For the same purpose, sheet steel piling has been driven (p. 27), along the shores of a New Jersey lake.

Quake Loses Bout With Arc Welded Building

Rack the 13-story Edison building in Los Angeles as it would, the recent California earthquake could inflict no damage, the arc welded seismic bracing being designed (p. 31) to resist shocks comparable to those which rocked San Francisco in 1906. . . . Prize-winning papers submitted in the Lincoln Electric Co.'s recent competition on cutting costs by redesigning to make use of arc welding are now available (p. 27) in a single volume. . . . Formation of a special committee to consider the possibility of combining all rivet specifications into one major recommendation, embracing all necessary categories of rivet steel, is sanctioned (p. 26) by the A. S. T. M. committee on steel.

Scenoramas To Tell All at World's Fair

Three-dimension painted backgrounds of the Steel corporation's exhibit at the Chicago Century of Progress exposition will depict (p. 11) the "key" steps in iron and steel, from the Minnesota ore ranges to finishing mills and uses. . . . The open-hearth scenorama will not disclose it, but designers now favor 18-inch buckstays (p. 29) because of the considerable increase in the relative section modulus found in the deeper section. . . . A use for steel sheets which also will not be evident in these scenoramas is individual clothes dryers for apartments (p. 32), requiring 175 to 500 pounds each. . . . A photoelectric unit operating in conjunction with an electric gage now records graphically (p. 33) the thickness of steel sheets.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

Post-depression Rebound of Wages

To the Editor:

We can be confident that two things will eventuate from this depression. First, that we are due for a great period of inflation, which does not necessarily signify danger if it is controlled by common sense. In fact, it must be realized that inflation is our only salvation. Second, that wages will start off from a low point and, when world trade is on a fairly even keel, that they will stabilize on a higher level than we now think possible.

L. W. RANDOLPH

Alliance, O.

Sees Sales Tax and Economy as Way Out

It is evident that the great body of our people, who think that they are not interested in taxation because they do not own real property, or make an income return, not only pay their share of taxation indirectly, but do actually pay a large amount directly. This being so, why not be honest in our taxation methods; cut out the bunkum about soaking the rich (if there are any now), and have it understood that inasmuch as every citizen is a taxpayer in one way or another, taxes will be spread on the basis of expenditures rather than on thrift. This means a general sales tax, one of the easiest to determine and collect, and the most equitable. The present idea of taxation is false; it puts a premium on extravagance and penalizes saving.

If the federal government will balance the budget by drastic economies, if that is possible; if the state and municipal bodies will follow suit, and if all the quack economists are segregated where they can talk themselves to death, the people of this country have brains and courage enough to work out their own salvation within a comparatively short time.

From a recent radio address by
J. B. BERRYMAN, President,
Chicago. Crane Co.

Major Steps in Business Reconstruction

We have reached a point of liquidation where we are justified in facing about and beginning to build again. To do so we must have leniency toward debtors, taking no forced or unnecessary action; the reopening of banks; the restoration of confidence; balancing of governmental budgets and maintenance of the gold standard and the protective tariff.

From address before Pittsburgh Traffic club, by
E. T. WEIR, Chairman,
Pittsburgh. National Steel Corp.

Business-like Approach to Unemployment

Private and public agencies have spent billions in voluntary doles to unemployment during the past year. The charitable sentiment prompting such gifts might have been more economically utilized had an equal effort been made to set before investors the opportunities offering in construction projects available, and which would have afforded gainful work. However, a business-like approach to the problem of unemployment was impossible during a period of national emotionalism. I find ample evidence to convince me that the country at large is now about ready to effect a solution of the question upon a more equitable basis.

CHARLES F. ABBOTT, Executive Director,
New York American Institute of Steel Construction

Coal Decision Indication of Liberal Antitrust Attitude?

WASHINGTON — Even the staid United States Supreme Court has joined the President and other federal agencies in supplying stimulus for the recovery of business. Its decision upholding the so-called coal pool in the Appalachian Coals Inc. case is the broadest interpretation in recent years of the antitrust laws.

Specifically, 137 operators in Virginia, West Virginia, Tennessee and Kentucky contended that they formed their pool to increase sales and production through better methods of distribution, intensive research and advertising, to achieve economies in marketing, and to eliminate abnormal, deceptive and destructive trade practices. The government claimed this was in restraint of trade.

With only one justice dissenting, the Supreme Court reversed the court of the western federal district of West Virginia. In the language of Chief Justice Hughes, the high court took the view that the operators in setting up their joint agency were "engaged in a fair and open endeavor to aid the coal industry in a measurable recovery from its plight."

This is regarded in Washington as a most liberal viewpoint and a specification which a good many industries might easily meet. Because some industries filed briefs in the case, as a friend of the court, considerable speculation has arisen that many selling pools will be organized. One report is that a selling pool in steel is in process of being set up.

Leniency Is Foreseen

Neither here nor in New York has there been any public development to justify such a report. It is, however, possible that as a contribution to recovery the Roosevelt administration may take its cue from this decision and be inclined to be lenient in the enforcement of the Sherman, Federal Trade and other acts.

It would be possible for industries to take concerted price action, justified by their situations, without the open organization of pools, if the department of justice were disposed to be guided by the Supreme Court decisions. But such action would be under scrutiny, just as the Supreme Court has stated its intention of safeguarding against any evils growing out of its ruling in Appalachian Coals Inc.

It is understood that steel leaders in New York deny emphatically that any action has been taken by their industry. It is pointed out that the decision fixes certain limitations and only 12 per cent of the total coal production of the country is involved in the Appalachian case. Certainly, the steel industry will proceed cautiously, as a copy of the decision was not available in New York until Friday morning.

Policy as Yet Undefined

It should be observed that thus far there has been no statement of its policy by the department of justice and no open development warranting any statement that selling pools in steel and other commodities are contemplated. In congress there has been no recent discussion of liberalizing the antitrust laws, save for a bill by Representative Kelly, of Pennsylvania, "to define the intent of the antitrust laws." This bill is now before the house committee on judiciary.

The Supreme Court decision was just one more development of a series since the inauguration of President Roosevelt calculated to bolster the morale of industry. Adjustment of the banking situation, decisive and encouraging steps toward balancing the budget, assistance for the railroads in continuing the freight rate surcharge and notice that no radical revision of the tariff will be undertaken are some of the steps.

Concerning the tariff, Secretary of Commerce Daniel C. Roper has been at some pains to inform business that a hasty revision is not in prospect. His viewpoint as expressed in Washington and in a recent address before the Export Managers club, New York, is as follows:

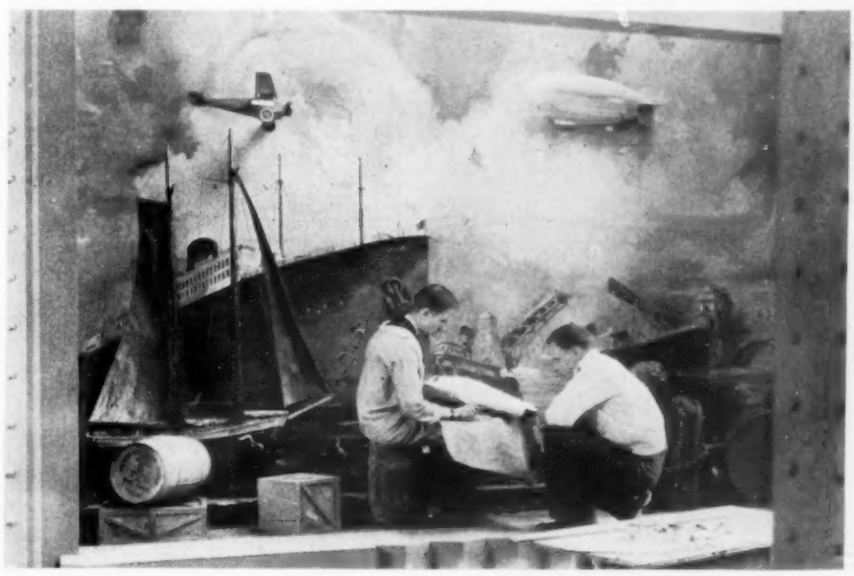
"I do not suggest any immediate and violent reduction in our tariff schedules. I suggest only that our tariff policy be one of common sense and common decency to other nations.

"There is no use in becoming virtuously indignant at the effective trade barriers thrown up by countries to which we want to sell our products, so long as we refuse to take as much as an inch from the top of the wall that we ourselves have erected.

"There are honest differences of opinion as to tariff policies but I believe that an overwhelming majority of the American people have unmistakably shown that they are tired of a policy that has antagonized every other nation in the world.

"In foreign commerce there must be buying as well as selling. No nation can successfully market its goods abroad if it stubbornly persists in refusing to let in a reasonable volume of the products of other countries."

A helping hand has been extended to the railroads, over the protests



STEEL, THE BASE OF MODERN LIFE: Dependence of civilization upon steel will be depicted by a series of scenoramas which will form the background of the exhibit of the United States Steel Corp. at the Century of Progress fair at Chicago, opening June 1. These scenoramas, creations of a special art employing the three dimensions of width, depth and height, will present open-pit iron-ore mining, blast and open-hearth furnaces, soaking pits, blooming and rolling mills, and the use of steel in transportation, building, agriculture and in aviation and marine transportation. Artists are shown building the latter scenorama, in the above illustration

of important consumers, by the interstate commerce commission extending from March 31 to Sept. 30 the surcharges on freight rates which were effective Jan. 4, 1932. These surcharges include 2 cents a net ton on finished steel products, 6 cents a ton on coal, coke and ore and 12 cents a ton on pig iron and scrap.

All surcharges and regulations are extended unchanged except that nonferrous ores and concentrates are now exempt and more than one surcharge of 6 cents a ton on lake cargo coal is unlawful. Pooling of revenues from the surcharges is discontinued and the Railroad Credit Corp. will be disbanded.

Whether the benefits of a number of the commodity divisions set up in the department of commerce by Herbert Hoover, when he was secretary, outweigh the necessity for economy is in the balance, with reports that Secretary Roper will eliminate some of them.

□ □ □

William Green, president, American Federation of Labor, has declared that in the event commodity prices increase because of currency inflation, wage increases must inevitably follow.

□ □ □

Interstate commerce commission has suspended until Oct. 1 the operation of certain railroad schedules which propose to increase carload rates on scrap iron and steel from Lynchburgh, Va., to Pittsburgh, from $5.10 to $6.17 per gross ton.

□ □ □

Reports to the department of commerce indicate that production of iron ore in Newfoundland will probably not increase despite the suggestion at the Ottawa conference that England would endeavor to absorb 100,000 tons a year.

Two Centuries Pass Since Discovery of Oxygen

INDUSTRIAL users of oxygen for welding and cutting purposes had more than passing interest in the 200th *anniversary of the birth of Joseph Priestley, English physicist and Unitarian divine, celebrated with appropriate ceremonies at Dickinson college, Carlisle, Pa., March* 13. *He discovered the element oxygen Aug.* 1, 1774, *named it "dephlogisticated air."*

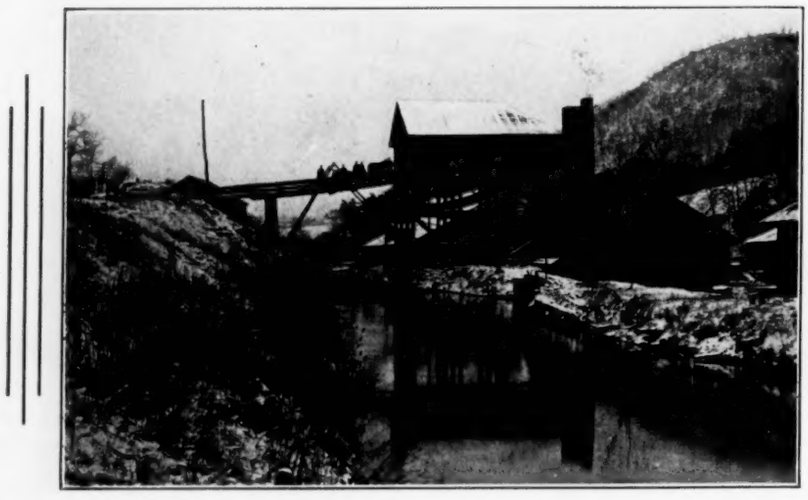
Born in 1733 *at Yorkshire, England, Priestley emigrated to Northumberland, Pa., in* 1794; *died in* 1804. *He never was naturalized and it is said that he never could understand how to make change in American coins.*

Author of many religious and technical books, he is claimed to be the first to render chemistry a precise science. Priestley also is credited with making the first notable experiments with rubber, applying that name to the substance since it would "rub-out" lead pencil marks.

McClintic Will Barge New Orleans Bridge Steel

After the first shipments of bridge erection equipment and caisson steel are made next month, McClintic-Marshall Corp. will get under way the fabrication of 42,000 tons of structural steel for the span of the Public Belt railroad and vehicular bridge across the Mississippi at New Orleans.

Fabrication of this tonnage will be done entirely at the Rankin, Pa., and Leetsdale, Pa., plants in the Pittsburgh district. All the steel will be shipped by Ohio river barge. Shipments are expected to extend into the early months of 1934. Loading facilities at the Rankin plant are being improved and dredging operations have been under way to permit heavy barge loadings.



A VETERAN OF THE CIVIL WAR: Hecla furnace, at Milesburg, Pa., was built in 1864 *and continued to make cold-blast charcoal iron until* 1920. *Photo courtesy of Mineral Industries, of Pennsylvania State college*

Will Talk on Cast Iron

"The Constituents of Cast Iron" will be the subject of E. G. Hill before the Pittsburgh Foundrymen's association's regular monthly meeting at the Ft. Pitt hotel, Pittsburgh, March 20. Mr. Hill has had several years experience in mining and recovery of nonferrous metals and at present is industrial fellow of the Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh.

Slag Co. To Build Dock

Cashion Slag Co., Butler, Pa., has asked federal permission to build a river loading dock on the left bank of the Monongahela river at Baird, Pa., approximately 35 miles above Pittsburgh. Improvements will include fender piling, pile clusters and an adjustable conveyor.

First Shipment to St. Louis

The first water shipment of steel products of the season from Pittsburgh steel mills into the St. Louis district was made last week when the steamer C. W. TALBOT of the Union Barge Line left with a consignment of steel products in tow.

To Liquidate Nova Scotia

Appointment of a liquidator for the Nova Scotia Steel & Coal Co., Sydney, N. S., has been asked by the receivers-managers, one reason advanced being the difficulty of obtaining funds for carrying on the business.

Institute Meets May 25

American Iron and Steel institute will hold its spring meeting May 25 at the Hotel Commodore, New York. This is the first meeting since last May. The program is now being drafted.

Will Buy Guard Fence

Four hundred feet of roadway guard fence will be bid to the Pittsburgh federal engineers, March 30, in connection with a lockkeeper's house at the Dashields dam, Glenwillard, Pa.

Mines, or Owners, "Captive"? Steel's Problems in Coal

By R. H. SWEETSER

PREVIOUS to the World war many iron and steel companies had acquired coal properties for a part of their fuel requirements and were getting a part in the open market. During the war, and again in the two coal emergencies following, it became more difficult for steel companies to obtain their coal requirements at a fair price, or even at any price when it came to quality. Gradually more and more coal land passed into the ownership of the steel companies; some of it at peak prices and some of it of remote value.

According to the latest statistics, detailed in the accompanying table, there are 19 steel companies in the United States with a steel ingot capacity of 63,297,600 gross tons annually, and a coal capacity of 77,073,000 net tons, or a ratio of 2435 pounds of coal per ton of ingots. Further, there are 12 iron companies, the list including one which makes pig iron and steel, with a capacity for producing 2,858,000 gross tons of pig iron, and 8,671,000 net tons of coal. If the resources of all these 31 companies be considered, the ratio of coal to steel becomes 2709 pounds of coal per ton of ingots.

17 Plants Lack Mines

There are 17 steel companies, with a total annual ingot capacity of 4,065,000 tons, that have no coal mines. One of these companies with a capacity of 600,000 tons of steel ingots per year is now owned by a large corporation with many captive coal mines. Ten companies with a total ingot capacity of 2,347,500 tons use either oil or natural gas in their open-hearth furnaces; only one of these fuel-oil consumers has a capacity of over 500,000 tons per year, and only three have over 250,000 tons capacity.

Of the 31 iron and steel companies in the United States owning or controlling captive coal mines, 11 own blast furnaces but no steel plants, and in at least two cases out of the 11 the coal mines are the only active departments of the company, and it is possible their blast furnaces will never run again. The coal mine capacity of these two companies is 2,860,000 tons per year.

There are 23 blast furnace companies in the country owning 38 merchant furnaces, but not owning any coal mines. The annual capacity of these furnaces is 4,937,000 tons of pig iron including 79,000 tons of ferromanganese. Five of these companies own and operate by-product coke ovens in connection with their 14 blast furnaces having an annual capacity of half the foregoing tonnage. Ten of the remaining blast furnaces are obsolete and likely to be abandoned.

The question frequently has been raised, and recently much discussed, as to whether the steel companies have tied up too much of their capital structure in raw material reserves.

The ratio of coal to steel is not excessive, though capacity does not tell the whole story. It is the capital buried in reserves that cannot be used for a century that has overburdened some of the captive-mined steel companies.

In dealing with the financing of steel corporations the bankers demand raw material reserves that will outlive the mortgage bonds, with longer life to the iron ore reserves than to the bituminous coal reserves. It is perhaps time to take another look at this requirement of banking houses, and to reconsider the effects of tax and interest burdens, and the ever-changing technical progress that gets more from a pound of coal.

It is possible to provide unwisely too far ahead for raw materials on the present basis of requirements for a ton of steel ingots, and it is likely that there will be a re-alignment of the relationship of steel and coal in the adjustments that are already under way.

Brought on by War Measures

Governmental control of the coal industry during the war and the coal emergencies following the war were largely responsible for the poor quality of coal and unsatisfactory distribution. This control was as bad for the coal industry as it was for the railroads; it was the last straw that forced integrated steel companies to acquire adequate coal reserves.

Some of the orders issued by governmental agencies with the avowed intention of increasing coal produc-

Coal Mine Capacities of Iron and Steel Companies

	Annual steel ingot capacity (Gross tons)	Annual bituminous coal capacity (Net tons)	Coal capacity per ton of ingots (Pounds)
United States Steel Corp.	27,841,300	37,700,000	2,708
Bethlehem Steel Corp.	9,540,000	12,720,000	2,666
Republic Steel Corp.	4,968,000	2,520,000	1,014
Jones & Laughlin Steel Corp.	3,420,000	5,000,000	2,924
Youngstown Sheet & Tube Co.	3,120,000	3,350,000	2,146
National Steel Corp.	2,232,000	600,000	537
Inland Steel Co.	2,000,000	1,440,000	1,440
American Rolling Mill Co.	1,902,000	650,000	683
Wheeling Steel Corp.	1,500,000	2,000,000	2,666
Corrigan, McKinney Steel Co.	1,000,000	Idle	.....
Crucible Steel Co. of America	875,000	780,000	1,782
Colorado Fuel & Iron Co.	840,000	4,500,000	10,716
Otis Steel Co.	828,000	Idle	.....
International Harvester Co.	732,000	900,000	2,460
Pittsburgh Steel Co.	720,000	798,000	2,216
Ford Motor Co.	519,300	2,800,000	10,738
Allegheny Steel Co.	450,000	190,000	844
Gulf States Steel Co.	450,000	500,000	2,222
Andrews Steel Co.	360,000	625,000	3,472
Total	63,297,600	77,073,000	2,435
Canadian companies:			
Algoma Steel Corp.	720,000	1,500,000	4,166
British Empire Steel Corp.	400,000	1,000,000	5,000
Total	1,120,000	2,500,000	4,464

Annual Pig Iron and Bituminous Coal Capacities

	Pig iron (Gross tons)	Bituminous coal (Net tons)	
Sloss-Sheffield Steel & Iron Co.	520,000	2,500,000	.....
Woodward Iron Co.	465,000	1,200,000	.....
Shenango Furnace Co.	410,000	400,000	.....
Reading Iron Co.	280,000	75,000	.....
Virginia Iron, Coal & Coke Co.	260,000	2,500,000	.....
Trumbull-Cliffs Iron Co.	260,000	550,000	.....
Pulaski Iron Co.	120,000	350,000	.....
Everett-Saxton Co.	90,000	360,000	.....
Central Iron & Coal Co.	85,000	300,000	.....
Colonial Iron Co.	72,000	300,000	.....
Jackson Iron & Steel Co.	60,000	36,000	.....
Jenifer Iron Co.	36,000	100,000	.....
Total	2,858,000	8,671,000	.....

tion during the emergencies were opposed to the common sense customs of the long-established coal industry. Instead of getting coal requirements from well equipped mines of large capacity and moderate costs, the railroad cars were so distributed that the small, high-cost, slow-loading mines were encouraged to start development, absorbing coal miners and coal cars, whose coal handling capacity thereby was reduced more than half.

This extra manpower and coal mine capacity has been a burden ever since the passing of the emergencies. A concentration of men and cars at well-managed mines would have prevented much of the subsequent burden of over-capacity, because many "marginal" coal operations would not have been started.

Benefit from Consolidation

With this larger and more intimate connection of steel with the coal industry came the benefits of the big movements that were being pushed by the steel companies, especially for safety and community co-operation; better housing conditions, water supply, sanitation and education. Roads in many mining regions were greatly improved by and through the influence of steel companies.

Extension of the safety movement to captive coal mines has greatly reduced hazards in the industry. At first the expense made the cost of coal from captive mines higher than the going market price, but in the long run a safe mine became a lower-cost mine.

As the rated capacity of captive coal mines amounts to about only 11 per cent of the total rated capacity of all the bituminous coal mines in the country, it might be asked how this could have such an important influence upon the coal industry. The adverse captive-mine influence was cumulative, because in most instances the new coal capacity not only immediately reduced the markets of the coal industry, but competed for coal miners and transportation service in times of coal shortage, and even competed for customers when the steel companies had more coal than they could use in their own plants.

Captive mines added to capacity, started more mining towns, and helped to bring about a condition that is one of the causes of over-production and the undernourishment of the coal industry. It is evident the steel industry is somewhat responsible in helping to bring about a remedy.

For a while "King Coal" was an absolute monarch, and ruled with a strong hand, with intermittent service that was not conducive to continuous processes in the steel industry. In some regions slack coal was coked in beehive ovens and shipped in coke racks to blast furnaces and foundries. The hard, strong coke of the Connellsville region became the standard blast furnace fuel of the world. The fact that the slack coal carried more ash than the lump coal did not disturb coal men, because before the World war not even the blast furnace men knew the difference. The preparation and the cleaning of coal did not receive much attention; there was no great demand for such things from the consumers—coal was coal.

Then came the by-product coke ovens and a demand for certain qualities in coals. As a rule the coal operators did not anticipate these new demands by undertaking research work for solving the problems of their markets, and for studying their own products. The demands of the steel industry for quality and dependable delivery were not fairly met by the coal industry.

But now the two greatest sources of complaint of the steel industry in getting coal from the coal operator, instead of from captive mines—irregular delivery and poor quality—have been removed. The railroads have adequate car supply and give dependable service; the coal operators have yielded to the insistent demands for quality coal, and have given much attention to better mining and cleaning of coal. When it was seen that the steel industry was spending millions for coal cleaning plants, and was willing to mine coal by safer methods and under better living conditions even at a higher cost, then the men in the coal industry realized their own need for producing better coal.

Steel consumers made almost impossible demands for better quality in steel and these demands had to be met. The notable demand made on the steel industry that was not successfully met during the past two years was that for lower prices. Net losses of the steel companies show that their total costs were more than they received for their products. The question of selling below cost of production is common to both the steel and the coal industry, and it must be answered.

Weigh Ownership Advantages

To raise the question as to whether the steel companies should let go their coal mines is to raise the question as to the soundness of vertical operations. There are advantages and disadvantages. A contract to deliver coal in desired quantity and quality at a fair price would be more satisfactory to a steel company than owning a coal mine; just as a contract for pig iron delivered as required and of the quality specified, at a fair price, would be more valuable to an automobile manufacturer than a blast furnace.

Ownership of a coal mine or of a blast furnace involves responsibility for the marketing of the entire production of the mine or the furnace. If a part of this production is not suitable for the requirements of the "captive-owner"—I use this phrase because it well expresses the situation—then that part must be put into the open market, either under contract or by spasmodic distress sales. Neither method is conducive to stabilized values. In some instances it has been possible for captive-owners to exchange certain domestic sizes not desired in their steel plants for finer sizes of metallurgical quality.

Is it desirable, then, for steel corporations to dispose of their coal properties and rely upon independent operators? This question cannot be answered one way or the other for the whole industry. Each case should be studied and decided separately, and that is being done. The conclusions reached will have important and direct bearing upon the stabilization of the bituminous coal industry. In some cases it is evident that the captive-owner will decide to go further into the coal industry; in others steel companies will decide that it is better to possess fair contracts for all coal requirements, under quality and delivery specifications.

Progress in fuel engineering has disclosed to some captive-owners that their coal reserves are not best suited to their requirements. In such instances it is evident that an exchange of coal properties would be desirable. Perhaps the exchange of a coal property for a good coal contract would be still more desirable.

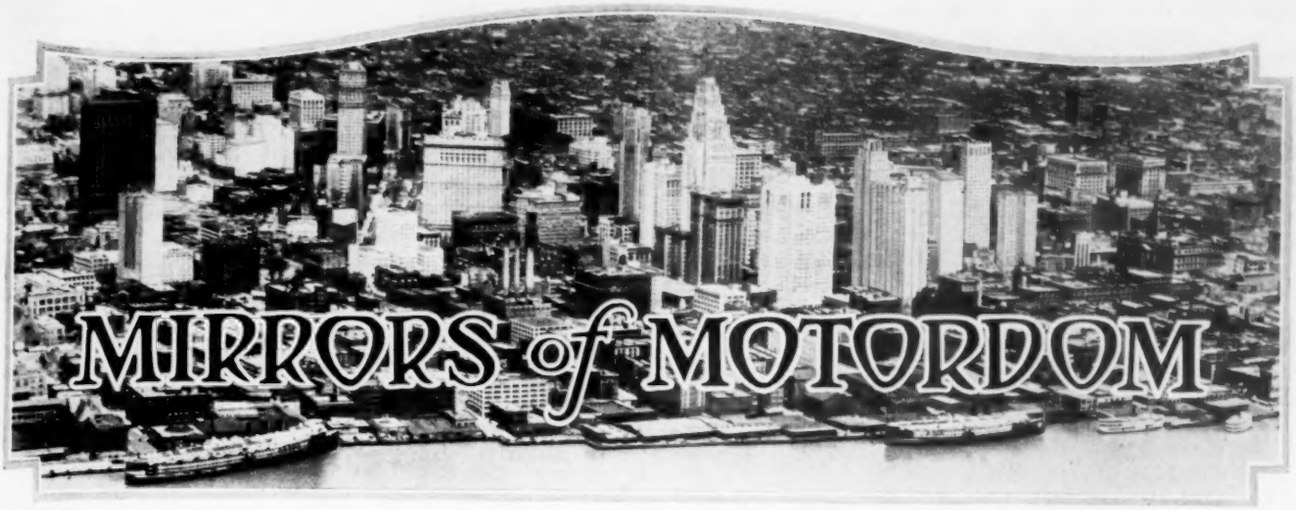
Slack Coal—Its Relation to Steel

In the days of the beehive coke oven the lump coal and domestic sizes were screened out and shipped to market, but the slack was put into beehive ovens and shipped out as furnace and foundry coke. It was not necessary to mix coals, neither was there need to pulverize; it was all one coal. The fact that the fines usually carried more ash than the prepared sizes did not make much difference to the trade that had been educated to a "strong" coke, columnar structure, metallic ring, silvery color, and other characteristics of hard, dense fuel.

Much high-ash slack went into by-product coke ovens during the first 25 years of this century, but with the growing demands of the iron and steel men for "clean coal," and with the rejection of low-grade coal for metallurgical fuel there was developed a distress market condition in the case of "slack" and "nut and slack," which brought the price to small fractions of the cost of mining.

In the case of captive mines the dirty slack was sent to the boilers of the steel plants. But where the freight rates were several times the price of slack at the mines it did not pay to use very high ash slack, when

(*Please turn to Page* 18)



DETROIT

RISING stock and commodity markets, reopening of banks and restoration of confidence in other parts of the country are saving Detroit in spite of itself.

Late last week a number of suspended releases for materials, including some from Chevrolet, Chrysler and Ford, were revived, and indications were that a fair measure of production would be regained this week.

To cite three typical resuscitations, Graham has recalled 1400 men at its body and assembling plants for March 20, Packard is resuming on the basis of its February schedule, and those General Motors plants which curtailed last week — principally Chevrolet, Pontiac and Buick—will again operate.

Sense Higher Material Prices

Buyers for the first time displayed concern over the trend of iron and steel prices, and in a typical instance protection on a flat-rolled product through the third quarter was sought—and refused.

It manifestly being impossible for dealers and manufacturers in so short a time to liquidate their stocks of new cars, which in most cases were ample, the resumption of assembling may be an earnest of a substantial spring market.

Some recovery also was apparent in the local situation: One large savings and several small commercial banks reopened, and federal conservators took charge of the two largest banking institutions. But the bulk of support which shored up Detroit was an overflow from the outside.

Much of it already is history, as the automobile and local situations have become day-to-day ones, but it is no exaggeration to state that depression and liquidation beat down upon Detroit early last week with a fury unparalleled in the history of any large city.

Last Monday, March 13, automobile and parts plants went down so completely that the week's output undoubtedly was the smallest since the manufacture of automobiles attained the stature of a major industry.

Coincident, another wave of separations broke over the industry, this time washing out sales and purchasing departments, which had suffered less than engineering and production in previous cleanups. Chrysler and General Motors cut advertising and sales promotion back sharply.

With the installation of conservators, the threat of speedy liquidation of the two large banking groups became imminent, spelling disaster for a large number of industries and retail establishments. The process of offsetting loans with deposits promised to wipe out working capital. Later in the week the conservators were reassuring on this point.

Incidentally, one of the first acts of the conservators was to discharge every official of both leading banks above the post of assistant cashier.

Discovery that some banks had sold personal notes to outlying institutions, thereby avoiding offsets where they were desirable, aroused apprehension, but a steel man beat one bank on this issue.

Drop Salaries, Ration Cash

Going into the fifth week with only two 5 per cents of deposits withdrawable, more than one establishment discarded the formality of a payroll, promising employes only a proportion of whatever cash was available at the end of the week, with no hope of future payment of any deficiency.

Executives whose salaries in 1929 were running into five figures were signing lunch checks for 25 cents. Retail trade was reduced to the point where street car and bus service was radically curtailed.

Pennyterias offering a surprisingly large meal for 6 and 8 cents became a real threat to regular restaurants. Panhandlers co-operated by lowering their touch to a nickel.

Most incredible of all that has befallen Detroit is the banking hiatus. While the governor's proclamation closing lower Michigan banks was effective Feb. 14, there had been no service since Feb. 11, as the intervening days were holidays.

From Feb. 11 to March 14 it was impossible in this city of nearly 1,750,000 persons to make a deposit or to clear a check! The only banking service available was the withdrawal of two 5 per cents. One steel executive carried a certified check for $1500 on a sound New York bank which would not even pass for carfare.

Woodin Forces Bank Action

In the same period, committees on which were represented the leading interests of Detroit were unable to agree on a plan that would reorganize the two leading banks or form new ones. In this there is some hint of automotive rivalry. The ultimatum of Secretary Woodin that an agreement be reached was bearing fruit at the end of the week.

On Friday a committee of Detroit bank stockholders, depositors and industrialists put up to Washington authorities a plan for the organization of one large bank to succeed the present two now in difficulty.

While the assistance of Henry and Edsel Ford had not been requested, their co-operation was said to be assured. It would surprise no one if Henry Ford set up in his home city of Dearborn a bank along the basic lines he favors.

Also during the same period, the Michigan legislature was in session at Lansing, taking no steps whatsoever to relieve the situation, this stalemate being partially due to the resentment of lower Michigan banks against their deposits in Detroit being regarded on a parity with other deposits and not as trust funds.

In such a situation, where an entire city is virtually "broke," in-

creasingly resentful and rapidly become a vast debating society, public opinion is apt to be warped, but the prevailing sentiment is that the governor's proclamation declaring the holiday beginning Feb. 14 was a mistake.

To save two banks in Detroit, almost the entire state was shut up tight, a wave of fear which resulted in runs on banks everywhere was set in motion, the country was driven to the suspension of gold payments. No small portion of blame is attached to the opposition to a $6,000,000 loan from the Reconstruction Finance Corp., which might have saved the situation.

There are some who believe that the Comstock proclamation of Feb. 14 will go down in history as touching off a dangerous phase of the domestic depression, much like the failure of the Vienna Creditanstalt on May 12, 1931, pulled down Europe.

Debts High, Disorders Few

Concerning the manner in which personal debts are piling up there is, of course, no detailed information, but the volume is enormous. On March 15 a number of industrial establishments came to the end of their financial rope and released officials whom they were unable to retain because of their frozen bank deposits. Those remaining, in some cases, are on salaries no higher than their stenographers' in 1929.

Through this extraordinary situation no disorders have arisen, save for a renewal of picketing at the Briggs plants at which employes went on strike late in January. The riot guns and tear gas with which the authorities liberally armed themselves probably will not have to be used. Detroit has proved that it can take it.

As previously related, the reopening of several banks in Detroit where deposits can be made and checks cleared, resumption of a number of lower Michigan banks on a restricted basis, heartening news from other districts, and the certainty that some progress is being made in breaking the banking jam in Detroit have brightened the situation appreciably.

So flexible is labor and so rapidly can material be received that almost overnight noteworthy resumption is possible, as some manufacturers already have shown. Decisions to curtail sales efforts are revocable, and if the pre-banking holiday volume of retail sales is attained shortly, spring advertising and sales campaigns can be reinstated without a gap showing to the public.

However, the release of frozen deposits is urgently needed. The most generous prospect is that 50 per cent of the assets of the two leading banks here can be disbursed shortly, which would restore $227,000,000 to circulation. But the lack of the other 50 per cent will compel some partsmakers, for a time, to be financed by the automobile manufacturers themselves.

Typical of how the situation has affected the latter, the Ford Motor Co. was employing 42,000 persons when the Michigan holiday was declared Feb. 14, this number was reduced shortly to 32,000, and last Thursday only 27,000 were on the payroll, though not necessarily actually employed at that time. If so much as 50 per cent of deposits is thawed out at this time the Ford company will still have the large sum of $30,250,000 tied up.

One automobile interest which stood its ground during the national holiday was Hudson-Essex. It had just appropriated a substantial sum for newspaper and radio advertising and staged large gatherings of dealers in various cities in anticipation of its spring campaign, and is proceeding without a break.

Since the Terraplane six was brought out last summer and the fanfare of its introduction died down, the merchandising effort of this producer has not been extensive, but the present campaign will be only a prelude if the retail market opens up, as may be reasonably expected.

The all-steel character of Terraplane bodies, X-type frame, wide springs, increased headroom and roomy bodies made possible by the elimination of sills and integration of the body with the frame, the large rear bearing on the driveshaft, the extremely narrow clearance of 0.0005-inch of the pistons, the rigid box girder guarding the engine from collision—all these, largely featuring steel, will be stressed.

Advance on Cars Possible

It is too early to appraise the price factor in the automobile stiuation, but the best minds of the industry are alert to it. The feeling is widespread that any change in material prices will be upward, a feeling which is evidenced by first indications of desire to cover ahead on unstated quantities—this protecting the buyer against any advance but not committing him to a definite purchase.

Whenever the retail market for automobiles reaches the point where the threat of an advance in the f.o.b. price would serve as a stimulant, recourse undoubtedly will be had to it. How imminent this is is impossible to gage at this time, as only initial confidence has been restored and the impulse to buy needs to be fostered.

There is reason for believing that plans of Ford for the new low-price line are very much in a formative state again. During the dark days of early last week it appeared that the new line would be indefinitely postponed, at least until fall, as the Ford setup appears to require a daily output of close to 5000 units to insure a profit. After losing $133,000,000 in 1931 and 1932 and having $60,500,000 frozen in Detroit banks, even Mr. Ford must figure closely.

But if the retail market snaps back, Chevrolet regains its sales stride of late December and early January, and Plymouth and Essex launch big programs, the time may be ripe and Mr. Ford as a defensive gesture at least may speed his plans.

It is not recalled that in automobile history a manufacturer has introduced a new model on Saturday and then shut down on Monday, but this was the experience of Chevrolet with its new standard model. Except for the smaller dimensions necessitated by a 3-inch shorter wheelbase, the new model being 107 inches, and slightly smaller engine, the bore being identical at 3 5/16 inches but the stroke being reduced from 4 inches to 3½, and the elimination of the starterator, heat indicator, syncro-mesh and freewheeling, the models are identical.

Bid for Steel Tonnage

There is no official confirmation but strong circumstantial evidence that a three-cornered struggle for Detroit's attractive steel tonnage is approaching.

National Steel Corp., with two blast furnaces, six open-hearth steel furnaces and bar, strip and sheet finishing capacity at Ecorse, in the south end of Detroit, is strongly intrenched.

Reports persist that the Ford Motor Co.'s steelworks, consisting of two blast furnaces, ten open-hearth steel furnaces, and bar mill capacity are passing to a large eastern steel interest.

A fresh development is the reputed interest of another large eastern steelmaker in a site on the Detroit river, just south of Detroit near the Great Lakes Engineering Works and controlled by an automobile interest.

Only last week came the announcement that the Rotary Electric Steel Co. (Michigan) was building a plant here for conversion of scrap into cold-drawn bars by an electric furnace-rotary mold process.

A month ago, when steelmakers sought lower freight rates to Detroit from the railroads, the threat of moving plants to Detroit was made. Early in March, the Pittsburgh & West Virginia and Wheeling & Lake Erie railroads published a joint rail-water rate of 18½ cents to Detroit, 10 cents under the present rate, the Nicholson steamship line to take steel at Huron, O., for water shipment to Detroit, but the rate was canceled as of March 16.

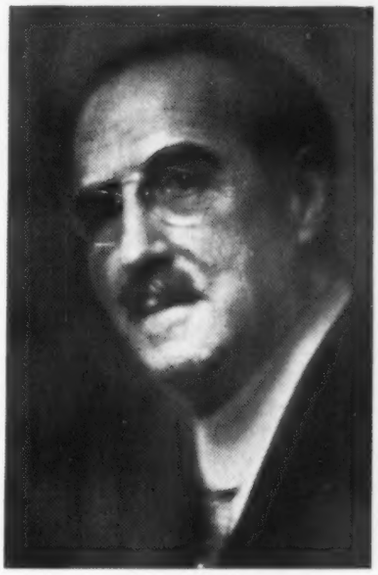
Industrial Men in the Day's News

Dr. Frederick M. Becket, President, American Institute of Mining and Metallurgical Engineers

HE is vice president of the Union Carbide, Electro Metallurgical and Haynes Stellite companies, and president of the Union Carbide Laboratories.

MUCH of his technical skill has been devoted to the ferroalloys. Over 100 patents attest his ability.

FOLLOWING the award of the Perkins medal, he became president of the American Electrochemical society in 1925. He finds diversion in music.



ELECTION of Dr. Frederick M. Becket as president of the American Institute of Mining and Metallurgical Engineers Inc., as announced at the recent 142nd meeting of the organization in New York, is in recognition of long distinguished service in the electrometallurgical and electrochemical industry.

Born in Montreal, Que., and graduated from McGill university, with a subsequent doctor's degree, Dr. Becket parallels in these respects the career of a former president of the institute, Dr. Mathewson, who held office 10 years ago. Upon graduating from McGill, Dr. Becket came to the United States, where he became associated with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. During these early years he also found time to work for a master's degree at Columbia, from which he later, in 1929, was also to receive the degree of doctor of science.

In 1903 he organized the Niagara Research Laboratories, Niagara Falls, N. Y., which was purchased in 1907 by the Electro Metallurgical Co., now a unit of the Union Carbide & Carbon Co., New York. He has been affiliated with the Niagara company and its successors ever since. Today, Mr. Becket is vice president of the Union Carbide, Electro Metallurgical and Haynes Stellite companies, and is president of the Union Carbide & Carbon Research Laboratories Inc.

Dr. Becket devoted much of his early attention to the direct production of steel from iron ores and to the commercial production of ferroalloys, including those of chromium, tungsten, molybdenum and vanadium. One of his most important contributions was in the manufacture of ferrovanadium. Ferrotungsten and, more recently, ferrochromium also have been among the more important materials to engage his energies. More than 100 United States patents carry his name.

Dr. Becket was president of the American Electrochemical society in 1925-26, following the award to him of the Perkins medal in 1924. He is a musician of noteworthy ability, and he finds time to devote to recreation in golf.

HENRY S. BEAL, general manager, Jones & Lamson Machine Co., Springfield, Vt., and elected president of the National Machine Tool Builders association last October, has been made president of the Sullivan Machinery Co., Chicago.

Mr. Beal, whose career was sketched in STEEL for Oct. 24, 1932, is a native of Rockford, Ill., and has been with the Jones & Lamson company since 1910, becoming general manager last spring.

As president of the Sullivan Machinery Co. he succeeds Arthur E. Blackwood, now chairman of the board, who has been with the Sullivan company since 1897. Until 1919, Mr. Blackwood was manager of the New York city sales office, going to Chicago as vice president and becoming president four years ago, following the death of Frederick K. Copeland.

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Fred Waldorf has been appointed district manager of sales at Pittsburgh, with offices at 119 Gould avenue, for the Bantam Ball Bearing Co., South Bend, Ind. Mr. Waldorf, who has had many years experience in roller bearing sales and engineering work, will handle industrial sales for the company.

S. Douglas Gibson has been placed in charge of the Washington office at 1108 Sixteenth street, for the Bantam company.

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Philip M. Guba, recently appointed assistant manager of sales in Detroit for the Carnegie Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co., was honored March 15 at a luncheon given by Arthur Schaeffer, district manager of sales for the Republic Steel Corp., Detroit, and W. J. Hanna, assistant district sales manager of that company. Among those attending were William B. Weston, Detroit district manager for the Carnegie, Illinois and Tennessee companies; W. B. Topping, John S. Hegeman and Russell Dexter, of the Bethlehem Steel Corp.; Frank D. Heath, Jones & Laughlin Steel Corp.; A. A. Keally, Sharon Steel Hoop Co.; R. J. Mullaly, Youngstown Sheet & Tube Co.; L. H. Carlisle, Union Drawn Steel Co.;

W. W. Noble, Pittsburgh Crucible Steel Co.; E. D. Pumphrey, Corrigan, McKinney Steel Co.; J. H. Fitch, Inland Steel Co.; Robert Atkinson, Timken Steel & Tube Co.; R. L. Shugg, American Rolling Mill Co.; Paul B. Allen and H. B. McGregor, Otis Steel Co.; Clyde Craine, Craine-Schrage Steel Co.; M. W. Floto, American Steel & Wire Co.; George Griese, Great Lakes Steel Corp., and Russell Wykoff, Empire Steel Co.

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C. C. Pinkney, formerly with the Bethlehem Steel Co., is now associated with the A. Milne & Co., 745 Washington street, New York, being New England sales representative at 8 Oliver street, Boston.

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Le Roi J. Williams has been elected vice president and general manager of the Grigsby-Grunow Co., Chicago, succeeding Don M. Compton, resigned. Mr. Williams formerly was assistant to the president.

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William A. Knapp, formerly vice president, Butler Mfg. Co., Kansas City, Mo., is now representing A. W. Wheaton Brass Works Newark, N. J., also Ralph N. Brodie Co., Oakland, Calif., manufacturer of meters and regulators, in the Kansas City territory.

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James Winston has opened offices at 558 Pedley street, San Bernardino, Calif., where he will do estimating, drafting, engineering, contracting and consultant work for structural steel, architectural metals and metal building products firms. Mr. Winston formerly was chief engineer of the Elizabeth Iron Works Inc., Elizabeth, N. J., and was in charge of engineering and sales.

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Fred J. Esslinger, formerly with the Petroleum Iron Works, Sharon, Pa., in charge of its metallurgical laboratory and welding rod developments has joined the technical staff of the Champion Rivet Co., Cleveland. He will be engaged primarily in the development of welding rod coatings for particular applications. He received his technical training at the Friederich Wilhelm Technical university of Berlin.

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Lewis W. Hicks Jr. was formally made assistant secretary and assistant treasurer of the Allegheny Steel Co., Brackenridge, Pa., at the annual meeting of directors, March 15, as noted in STEEL for Jan. 23. Mr. Hicks is a nephew of Harry E. Sheldon, president of the company, and son of Lewis W. Hicks Sr., president of the Penn Iron & Steel Co., Creighton, Pa.

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N. B. Chace, for 16 years president of the Fosdick Machine Tool Co., Cincinnati, has retired to devote his time to other business interests.

George G. King, president of the Peters Cartridge Co., owner of the Fosdick company, has become president of the Fosdick company.

F. C. Tuttle continues as secretary and is now also treasurer; he is vice president and treasurer of the Peters company.

W. R. Hofmann, identified with the Fosdick company for many years in an executive capacity, has been appointed manager.

Died:

HENRY C. BREIDERT, 57, chief contracting engineer for Ft. Pitt Bridge Works, at Pittsburgh, March 14. His 30-year affiliation with the Ft. Pitt company was divided between Pittsburgh and Chicago. He was born in Pekin, Ill., was a graduate of the University of Illinois, and in later years a member of many engineering societies.

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Thomas E. Shaw, 32, Pittsburgh lawyer and son of George E. Shaw, secretary and director of the Crucible Steel Co. of America, at Pittsburgh, March 14.

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Harry E. Cameron, nationally-known bridge-designing engineer and 26 years employed by the American Bridge Co., at Dormont, suburb of Pittsburgh, March 13. He was born at Carrolton, O., was a graduate of Ohio State university and a member of many engineering and fraternal organizations in Pittsburgh.

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B. Dawson Coleman, 67, eastern Pennsylvania industrialist, at Philadelphia, March 3. For many years he was associated with the Cornwall Ore Bank and the Lebanon Furnaces, continuing as director after they were absorbed in 1916 by the Pennsylvania Steel Co., now a part of the Bethlehem Steel Co.

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Henry H. Martin, 45, credit manager, Republic Steel Corp., at Birmingham, Ala. He was with Republic four years and prior to that with Tennessee Coal, Iron & Railroad Co. for nearly 20.

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George S. Boudinot, 77, secretary emeritus, National Association of Manufacturers, at New York, March 14. Before going with the association in 1901, he was chief of the division of manufactures of the census bureau, Washington.

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Peter B. Johnson, president, Therm Gas Generator Co., Seattle, manufacturer of kerosene oil burners and other patented products, March 5.

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William A. Rossell, 52, assistant northeastern district manager, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., at Summit, N. J., March 8. He had been associated with the Westinghouse company for 32 years.

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Charles MacCaughey Sames, since 1916 associate editor of American Society for Mechanical Engineers, at New York, March 8. A graduate of Rose Polytechnic institute in 1886, he entered the Thomson-Houston Electric Co., Lynn, Mass., returning in 1887 to his native town of Rockford, Ill., to enter business with his father, a manufacturer of agricultural implements. In 1905 he compiled and edited a "Pocket Book of Mechanical Engineering" and thereafter was identified with association and publishing activity.

Mines, or Owners "Captive?" Steel's Problems in Coal

(*Concluded from Page* 14)

a little more money would buy cleaner coal. The public utilities continued to use high-ash slack because they got their costs back, but now that pulverized coal is being used so much there is a demand for cleaner coal on account of two bad features of high-ash slack. An excess of "heavy gravity material" in slack coal greatly reduces the coal pulverizers' capacity and causes such a cloud of "fly ash" that the public complains.

Again the steel industry has taken the lead in making progress in the utilization and marketing of coal, and now the larger steel companies have installed cleaning plants for the minus 3-inch sizes. As a rule the minus 1½-inch or even ¾-inch are suitable for metallurgical coals, because coking coal has to be pulverized when used in mixtures for by-product coke ovens, and steam coal must be crushed for stokers, or pulverized for raising steam. The plus 1½-inch gas coal can be used in the gas producers. One recognized authority in the steel and coal industries recently said:

"Good coals, ¾-inch or less in size, when thoroughly cleaned have no substitute as metallurgical fuel; it is doubtful if fine coal containing as much as 8 per cent ash will knowingly be accepted, either as metallurgical or steam coal, particularly where the freight rate is the gerater cost."

The failure to produce low-ash slack coal in the past was the main reason for the less-than-cost price, and for its replacement by gaseous and liquid fuels. In many cases the low price paid was enough for its low fuel value. Steel companies separated from their coal mines by heavy freight rates are removing this burden by cleaning the slack at the mines.

Steel Corp. Recovery Plans Survive Record 1932 Loss

PREPARATIONS for the future and rising demands for steel are manifest in many features of the United States Steel Corp.'s current pamphlet report for 1932 summarizing its operations and financial status.

Directly it explains that its shipments of rolled and finished steel products—3,974,062 tons—exceeded production by 382,588 tons, stocks having been reduced by this amount.

Expenditures for maintenance, depreciation and obsolescence dropped from $107,737,302 in 1931 to $69,432,417 last year; nevertheless, the latter sum includes large amounts "to keep inactive departments prepared for resumption when business improves."

Total capital expenditures on properties in 1932 were $7,966,382, including $5,338,619 for manufacturing plants. From the dismantlement of properties $425,774 was obtained.

"Installation during recent years of modern and improved facilities at various plants, adding to their efficiency, in large measure accounts for retirements made during the year," the report states.

Inventory Value Down

The value of all inventories was reduced from $302,599,748 in 1931 to $258,354,252 in 1932. Property investment dropped from $2,379,559,292 to $1,650,816,309; liabilities from $63,881,148 to $46,987,376; payroll from $266,871,413 to $133,912,809.

"The depression," says Myron C. Taylor, chairman, in transmitting the report, "has intensified activities in securing closer co-ordination and consolidation of operations, with resulting economies which should be reflected in relatively more satisfactory net income results upon improvement in business."

One item over which the corporation had little control was taxes, which in a year marked by the lowest production in its history, held up to $31,942,515, compared with $34,247,632 in 1931. Practically all this tax except $172,718 federal income, excise and miscellaneous, was absorbed by state and local governments. For the corporation it meant that the tax average per net ton of finished steel for sale nearly doubled —$8.89—in contrast with $4.88 in 1931. In 1931 it approximated $1.07.

While the total sum of taxes for the corporation was 141 per cent greater than in 1913, average daily earnings per employe as of October last year—$4.81—even after the 25 per cent cumulative wage and salary reductions, was 84 per cent above October, 1913. Curtailment in payroll attributed to the 15 per cent reduction made last spring resulted in a saving of $9,600,000.

The number of employes working full time during the year was only 18,938; and those on part-time, 139,094; the total, 158,032 representing 68 per cent of the working force required for operating all departments at capacity.

After all these adjustments, the unit labor cost of producing steel increased, due to low production. The average of wages and salaries paid, in comparison with output of finished steel, was $37.86 per net ton in 1932, and in 1931, $37.08. In 1913 it was $16.74. Actual prices received for rolled and finished steel products last year were $2.58 per ton less than in 1931.

Production Off Sharply

The decline in production in 1932, compared with the annual average in the five years ending Dec. 31, 1930, was approximately 10,000,000 tons, or 74 per cent; in contrast with 1929, it was down 77 per cent.

Preferred dividends paid during the year absorbed $20,716,163 and there still remained a cumulative dividend arrearage on preferred of $4,503,513. Total deficit, after payment of preferred dividends and other charges, was $91,891,867, against a deficit of $49,165,485 in 1931. Gross revenue decreased in the two years from $729,577,467 to $357,201,705; cash on hand, from $75,239,562 to $60,224,116; value of marketable securities, from $69,358,308 to $46,139,383.

The total number of stockholders, however, increased from 223,272 in 1931 to 237,916 in 1932.

National Increases Cash

National Steel Corp., Pittsburgh, which in 1932 had a net profit of $1,662,919, charged off $3,089,912 in depreciation or approximately equal to the $3,117,402 written off in 1931. Reserves of $1,467,526 for furnace relining and rebuilding showed an increase over the $1,343,942 on Dec. 31, 1931, in the pamphlet report just issued.

The balance sheet shows funded debt was reduced $1,233,333, during 1932. Cash holdings at the end of 1932 totaled $6,215,432, compared with $3,755,774 at the beginning. Ratio of current assets to current liabilities was 9.4 to 1 on Dec. 31, compared with 4.7 to 1 the year preceding.

□ □ □

Wheeling Steel Corp., Wheeling, W. Va., encountered net loss of $3,274,832, after all charges in 1932, compared with net loss of $3,339,139 in 1931. Inventories on Dec. 31, 1932, totaled $16,027,984, compared with $19,608,376 the year preceding. Current assets Dec. 31, 1932, totaled $22,548,632 and current liabilities $2,450,673.

□ □ □

Follansbee Bros. Co. Inc., Pittsburgh, reports net loss for 1932 of $1,044,897 after charges. By comparison, net loss was $849,906 in 1931. Current assets at the end of 1932, of $2,631,391, were 14.5 times current liabilities of $180,816.

□ □ □

National Supply Co. of Delaware and subsidiaries, including Spang-Chalfant & Co. Inc., Pittsburgh, reports net loss of $3,847,638 for 1932. This is a better showing than the net loss of $4,495,797 in 1931.

Spang-Chalfant & Co. Inc., Pittsburgh, reports independently of the above National Supply Co. statement its net loss of $900,969 after depreciation, interest and other charges in 1932, against net loss of $278,008 in 1931.

□ □ □

Virginia Iron, Coal & Coke Co., Roanoke, Va., reports net loss in 1932, after charges, of $32,495, compared with net profit of $105,948 in 1931.

□ □ □

Warren Foundry & Pipe Corp., Wharton, N. J., reports net loss in 1932, after charges, of $49,940, compared with net profit of $294,188 in 1931.

□ □ □

Valley Mould & Iron Corp., Sharpsville, Pa., reports net loss of $376,208 after depreciation, interest, and other charges in 1932, against a corresponding loss of $146,519 in 1931.

□ □ □

Pittsburgh Forgings Co., Coraopolis, Pa., reports net loss of $159,694 in 1932, against net loss of $184,458 in 1931. Greenville Steel Car Co., Greenville, Pa., subsidiary of Pittsburgh Forgings Co., had a loss of $96,719 for the year, against net loss of $75,214 in 1931.

□ □ □

Minneapolis-Moline Power Implement Co., Minneapolis, for 1932 had net loss after all charges of $3,107,821 compared with loss of $1,534,074 in 1931. Current assets of $14,638,033 contrast with current liabilities

(*Please turn to Page* 40)

EDITORIAL

Stability of Business Is a Great National Asset

IN THE current emphasis on the problems of banks, the importance of other kinds of commercial enterprise is being overlooked. While the banking institutions of the country total less than 20,000, the number of companies engaged in manufacturing, wholesaling and jobbing, retailing, contracting and service exceeds 2,000,000.

These commercial institutions—large and small—constitute the backbone of the nation's business system. Their stability is the key to consumption,. distribution, production, employment, profits and many other elements necessary for national prosperity. In view of their important role in the economic welfare of the country, it will be interesting to see how they have been weathering the storm of this depression.

The following shows the total number of companies in business and the number and per cent of failures during the four periods of abnormal insolvency in the past 40 years:

Failures in Four Depressions*

Year	Number in business	Number failed	Per cent failing
1892	1,035,564	10,270	.99
1893	1,059,014	15,508	1.46
1894	1,047,974	12,724	1.21
1895	1,053,633	12,958	1.23
1896	1,079,070	15,094	1.40
1897	1,086,056	13,083	1.20
1898	1,093,373	11,615	1.06
1915	1,770,914	19,035	1.07
1922	2,074,617	22,415	1.08
1929	2,213,935	19,703	.89
1930	2,185,358	24,107	1.10
1931	2,125,675	26,381	1.24
1932	2,122,845	28,773	1.36

*From Bradstreet's.

Insolvency Record of Present Period is Better Than That of Nineties

It is evident that commercial failures since the market crash in 1929 have been fewer in number in relation to the number of companies in business than in the prolonged dark period of 1893-1897. The average percentage of failures for 1930, 1931 and 1932 was 1.23 compared with 1.30 for 1893, 1894 and 1895—the worst three consecutive years in the depression of the nineties. The tabulation also shows the comparatively mild effect of the 1914 and 1921 depressions on insolvencies in 1915 and 1922, respectively. Incidentally, financial troubles late in 1907 lifted commercial failures in 1908 to only .94 per cent.

The record is impressive in that it shows a marked degree of stability in the rank and file of business institutions. That in 1932—a year of acute distress in practically every line of activity throughout the entire world—9864 companies out of every 10,000, or 98.64 per cent, remained solvent is a fine commentary on the ability, resourcefulness and courage of American business executives.

This showing appears even more significant when it is compared with the insolvency record of banks in the United States. In the following the total of 19,163 embraces all kinds of banks, possibly including some that should not be counted. In any event, the percentage of bank failures, if in error at all, is too low rather than too high.

	Total number in United States	Number of failures in 1932	Per cent failing
Commercial companies..	2,122,845*	28,773*	1.36*
Banking institutions.....	19,163	1,453†	7.58

*From Bradstreet's. †From Federal Reserve board.

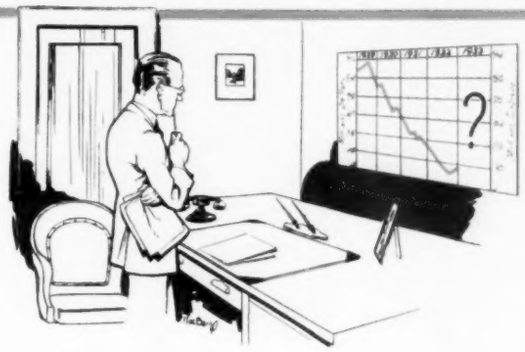
Stability of All Commercial Companies Exceeds That of Banking Houses

How remarkable it is that ordinary commercial businesses, which are conducted with little or no federal, state or local supervision, are able to demonstrate a much better record for stability than banking institutions whose operations are supposed to be checked and safeguarded by national and state regulatory bodies!

Anyone can enter business regardless of his ability ,experience or even the possession of sufficient capital. Bankers are supposed to satisfy certain definite requirements in order to obtain charters. Yet the percentage of insolvency among banks in 1932 was five and one-half times that of failures of all businesses.

The ability of business generally to keep its house intact in the face of the destructive forces of 1932 is a real national asset. It is one of the strongest elements in the foundation on which this country henceforth will erect a new and sounder economic structure.

THE BUSINESS TREND



Rebirth of Confidence Brightens Outlook

BUSINESS is more sanguine as to the outlook than at anytime since the first quarter of 1931. Events of the past fortnight have cleared the atmosphere. Already signs of returning confidence are beginning to appear.

The dissipation of fear and rebirth of confidence cannot proceed far without inducing a stronger demand for commodities. The marked tendency toward higher prices for certain products—notably nonferrous metals—raises the question as to how iron and steel prices will react to a moderate buying movement.

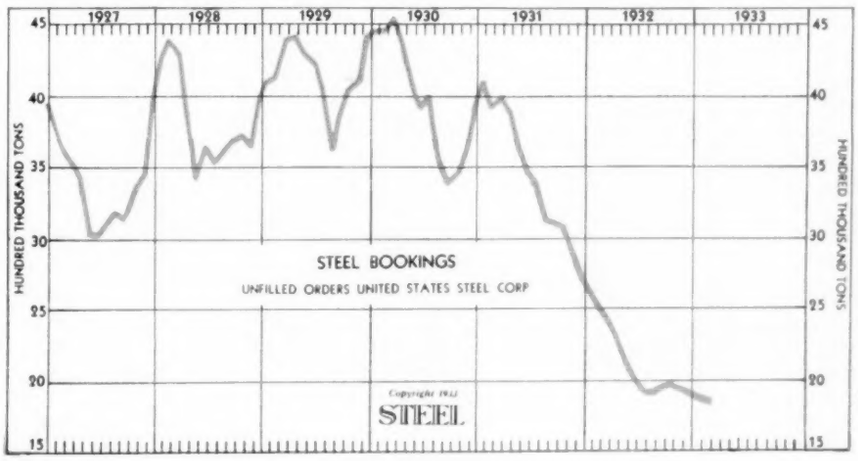
In past depressions, increased demand after an extended period of dullness has been attended first by a rise in the prices of steelworks scrap and later by an upturn in the quotations of pig iron and finished steel. In 1908, following the financial troubles of October, 1907, scrap prices and the demand for pig iron and finished steel registered their low points almost simultaneously and moved upward together. Similarly in July, 1921, scrap prices and iron and steel demand turned the corner arm in arm and climbed upward in unison.

Prices of pig iron and finished steel do not respond as quickly as scrap prices. In 1908 the volume of demand started to expand moderately in July, but steel prices tended downward until April, 1909, and began to reclimb in May. A sustained rise in pig iron did not begin until July. In 1921 expansion of demand began in August, but steel prices dropped until the following February and pig iron prices did not respond until March, 1922.

How Long Will Upward Price Movement Lag Behind Rise in Demand?

Thus the lag between resumption of active buying and definite upward movement in iron and steel prices ranged from seven to 11 months. This phenomenon probably is explained by the fact that a wave of buying following on the heels of a dearth of orders induces a real test of prices which continues until a point of resistance is encountered, from which they climb to higher levels.

Whether or not the period of price testing in 1933 will be of shorter duration than in 1908 and 1922 is problematical; the controlling factors are not comparable. Right now the most significant element is the rapid restoration of confidence, which will bring good fortune in its wake.

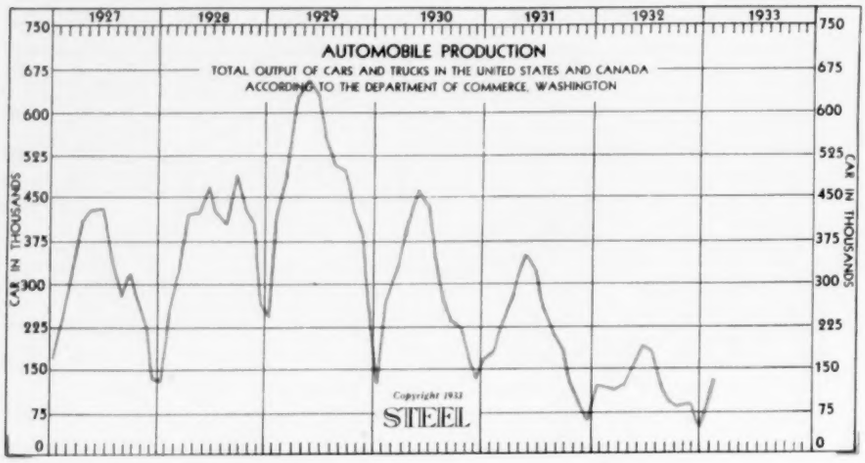


1933
Million Tons
Feb. 1,854
Jan. 1,898

1932
Dec. 1,968

1932
Million Tons
Feb. 2,545
Jan. 2,648

1931
Dec. 2,735



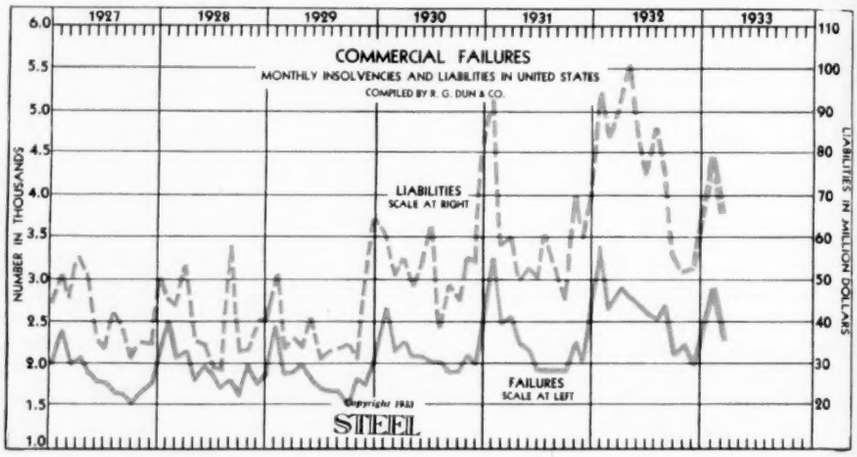
January, 1933	133,472
December, 1932	109,542
January, 1932	123,075

Automobile Output Steps Up in January

Production of passenger cars and commercial motor vehicles in the United States and Canada in January totaled 133,472 units. This is a gain of nearly 18 per cent over the previous month and compares with the 123,075 units produced in January, 1932. According to the current report from the United States department of commerce, January's output embraced 111,318 passenger cars, as against 87,760 in December, and 22,154 trucks, compared with 12,560 in the preceding month.

February Business Failures Lowest Since 1930

The February record of commercial failures, as compiled by Dun & Bradstreet Inc., reveals a slightly brighter outlook on the business situation. There were 2,378 business failures in the United States during February, with a liability total of $65,576,068. This is the lowest number for the second month since 1930, and is 13 per cent lower than the 2,732 failures of February, 1932. Liabilities for February were 22.8 per cent less than the same period last year and compare with January's liability total of $79,100,602.



	Number	Liabilities
Feb., 1933	2,378	$65,576,068
Jan., 1933	2,919	79,100,602
Feb., 1932	2,732	84,900,106

	1933	1932
March 1	$6.35	$7.31
February 1	6.53	7.52
January 1	6.79	7.73

Commodity Price Index Declines to Lower Level

Bradstreet's commodity price index for March 1 showed a continuation of the downward trend. The index stood at $6.35, a decline of 2.7 per cent from the level of $6.53 on Feb. 1. This is the fifth consecutive decline since the temporary spurt of last summer and places the level approximately 5 per cent below the low mark for 1932. To find a lower record of commodity prices it is necessary to go back to July, 1897, when the index was down to $5.85.

Part II

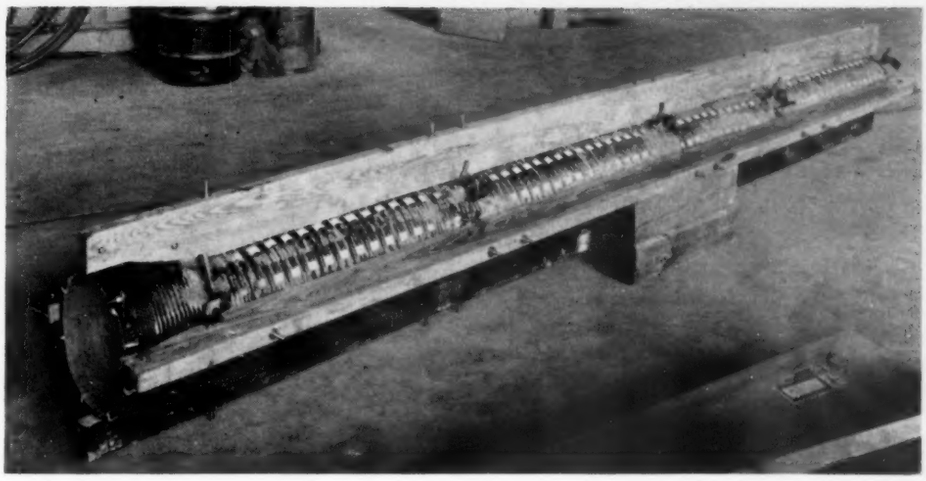


FIG. 1—Inductor coil for high-temperature heating of 12-foot pipes, 6-inch inside diameter. Operation is usually in a vertical position, space between the coil and the pipe being filled with silica sand

PRACTICAL APPLICATION OF INDUCTION HEATING TO SOLID MATERIALS

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Vice President and Technical Adviser
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ANY consideration of a mathematical treatment of principles which apply in the inductive heating of magnetic steels is quite beyond the scope of this discussion. Attention might be called, however, to a few physical phenomena which it is well for the designer and user alike to keep in mind when the inductive heating of magnetic steels is under consideration. The main agent in heating magnetic steels is the circulating current induced in the material.

If a billet of magnetic steel 3 or more inches in diameter is placed in a solenoidal coil and 20,000 ampere turns per foot are employed, it will be found that it heats effectively and rapidly up to the temperature where magnetism is lost even when the frequency of the inducing current is only 60 cycles. A billet 3 inches in diameter can be heated beyond this point using 60-cycle current but only by greatly and impractically increasing the amperes in the inductor.

If, when this 3-inch billet has reached 600 degrees Cent., the 60-cycle current in the inductor is changed to a current of equal emperage but having a frequency of 1000 cycles, the billet will continue to rise rapidly in temperature and may be melted.

Now it can be shown that the kilowatt minutes per pound of magnetic steel necessary to bring the temperature to 600 degrees Cent. is just about equal to the additional kilowatt minutes required to bring it to a forging temperature of 1200 degrees Cent. The obvious commercial deduction is that in many cases where 3-inch diameter or larger billets are to be heated to a forging temperature, the first half temperature stage of the heating may and generally should be done with normal frequency current and the second stage with high-frequency current, generally 1000 cycles. Application of direct induction to straight ferrous tubes and pipes is simple and presents no complications nor requires unusual equipment pro-

Fig. 2—Improving the cohesion of chromium plate on tubes by heating inductively. Asbestos board disks rotate and advance the tube through the short inductor coil

vided the tube or pipe has a diameter sufficient for effective heating with the frequency available. For heating tubes 3 or more inches in diameter, effective heating can be done with current of the usual frequency used in metal-melting practice. Where motor-generator sets are used for this purpose, to supply the high frequency power, a frequency of about 1000 cycles per second is now generally recognized as being most satisfactory from both technical and economic considerations.

Any problem which involves the heating without melting of symmetrically shaped metals, solid or tubular, which are over 3 inches along the smallest dimension of a right section, may therefore be handled with what may be termed "standard high-frequency power equipment." Owners of such equipment, and there is now installed about 12,000 kilowatts in the United States, may have at times an excess over that needed for their melting requirements. It is well for them to know the uses, other than melting, to which the equipment may be put.

Smaller Size, Higher Frequency

If the tubes are of smaller diameter, down to about 1½ inches, a higher frequency than 1000 cycles is indicated. High-frequency generators of the inductor type giving 4800 cycles are now in commercial use and the current supplied by these will heat efficiently tubes, rods, etc. of the smaller diameters.

When a steel tube is chromium-plated, the cohesion and quality of the plating is greatly improved if the tube is heated by induction to 1000 degrees Cent. or over. The Heppenstall Co., Pittsburgh, has been using this inductive method for heating chromium-plated tubes, as shown in Fig. 2.

As plainly shown in this illustration, the tube being heated passes through a relatively short inductor coil and is regularly and controllably rotated and advanced at an adjustable speed by the revolving asbestos board disks on which it rests. This ingenious and effective mechanical

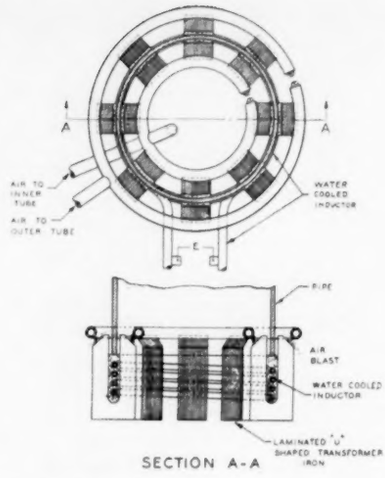

Fig. 3—Special type of inductive heater, employing transformer steel punchings, and designed for heating the end of small or medium diameter pipe to forging temperature

device was initiated and constructed by the Heppenstall company. The inducing current is supplied at 960 cycles from 150-kilowatt high-frequency generator equipment which was installed and chiefly used for melting high grade steels.

When for any reason a pipe is to be raised by induction to a certain upper temperature and then maintained at this temperature for a set period, this may be done by placing the pipe in an inductor coil as long as or somewhat longer than itself. To heat the pipe with economy, the inductor coil should have an inside diameter about 43 per cent greater than the outside diameter of the pipe. The space between the two is then conveniently filled with silica sand. This provides excellent heat insulation. By setting inductor and pipe in a vertical position, the sand may be poured in at the top and removed from the bottom by opening a trap. The coil is then ready to receive a second pipe.

Fig. 1 is a view of a coil made for heating in this manner, 12-foot pipes, 6 inches inside diameter. A decided merit of the inductive method of heating pipes or other large articles of a cylindrical shape is the highly uniform temperature from end to end which may be obtained. The coil for pipe heating, shown in Fig. 1, has been used successfully by the U. S. Pipe & Foundry Co., Burlington, N. J. In this case, the coil was supplied with current obtained from a 300-kilowatt generator, and the frequency was 960 cycles. The holding power, measured at generator terminals, to maintain the pipe steadily at a temperature of 950 degrees Cent., is about 65 kilowatts. Knowing the total area of the outside surface of the pipe, we obtain the rather useful figure that the power lost per square foot of pipe surface when at a temperature of 950 degrees Cent. is 3 kilowatts. This is the power which escapes through 1⅜ inches of silica sand under a temperature gradient of 930 degrees Cent.

In the case described the pipe was made of cast iron. It might have been heated effectively, however, if made of any other metal or alloy.

Induction Heating of Rolls

The inductive method is ideal for heating steel or cast iron rolls in the process of their manufacture. As in the case of pipe heating just described, the coil and roll are of about the same length. Both are set in a vertical position so the roll may be first lowered into the coil and when at the proper temperature, further lowered, for quenching into a water filled tank. In this case no heat insulation between inductor and roll is used. The speed of heating is so adjusted that the desired temperature gradient from surface to axis of roll is obtained just before quenching. The outside surface of roll thus may be made hard and the interior tough and softer.

The heating of common and big guns by the same inductive operation as applied to roll heating is here suggested as seeming to be practical and useful. It may be added that if the gun has a large bore, a full length inductor coil could be placed inside the bore. By so doing, the interior surface of the gun could be heated faster and hotter than metal nearer the outside.

Ferrous metals in variously fabricated forms such as rods, billets, tubes, pipes, sheets, autoclaves, etc.,

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POSSIBILITIES of induction heating in various commercial applications are disclosed in the accompanying article, the second of a series of two, abstracting a paper presented by Dr. E. F. Northrup before the Pittsburgh district section, Association of Iron & Steel Electrical Engineers, Jan. 14. The first installment was published in the March 6 issue of STEEL.

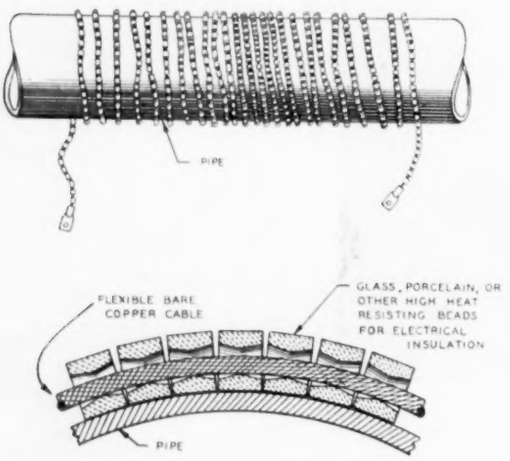


FIG. 4—Heating central section of a length of pipe inductively by winding it tightly with flexible copper conductor, strung with beads of refractory material. High-frequency current is required

may be placed conveniently in two general classes. In the first class belong all solid ferrous metals which in fabricated form require a reheating in order that some further operation or heat treatment may be given the metal itself. Thus, oil-well pipes are reheated to be normalized; billets are heated to be forged; steel rolls to be hardened; steel sheets to be annealed; etc. In most every case under class one, the final temperaure needed is well above the temperature where any magnetism is retained. Due to this fact, inductive methods generally require the use of curfent of a higher frequency than 60 cycles and the investment cost must include a frequency changer.

In the second class belong all ferrous metals which are heated, not for any operation to be performed on the metal itself, but for the purpose of using the heat given to the metal for heating something else. Examples are many. Thus, a pipe line may be heated inductively so the fluid it carries shall become heated. An autoclave may be heated inductively in order to heat the chemical inside it. A striking case is the use of inductive heating of automobile bodies to dry the paint by heat. The temperatures required are generally well under the point where magnetism is lost.

Localized Heating of Pipe

It is frequently required to heat for forging a large, medium or small diameter pipe at one end and a certain small distance back from this end. This may be done most efficiently and conveniently in most cases by inserting the end of the pipe to be heated into a water-cooled solenoidal coil which has an inside diameter but slightly greater than the pipe. In this case the pipe will heat quickly, if the power used is sufficient, only over that length which is within the coil. The line of demarcation between the heated and unheated portion is sharp and it is thus possible to avoid wasting energy by heating any portion of the pipe which it is not desired to heat.

Special cases have arisen where it is required to heat a large or medium diameter pipe to a forging temperature back for only an inch or two from its end. To meet this demand, a special type of inductive heater has been designed and used which employs transformer steel. This is shown in Fig. 3. Here is seen arranged in a circle, U-shaped transformer steel punchings. When, as will generally be the case, high frequency is used, the steel laminations should be not over 7 mils thick. The energizing coil is circular and rests in the bottom of the circular channel which the assembly provides. The pipe end is inserted in the upper portion of the channel which it nearly fits. Lines of induction thread the wall of the pipe over a certain portion of the part to be heated. These lines pass radially through the pipe end and the induced current flows circumferentially around the pipe. This heating current is confined closely to the region to be heated. This arrangement will heat the extreme end only of a pipe and will do this with the minimum of wasted energy. It is to be observed that the circle of laminations may be increased or decreased readily in diameter to provide for receiving the ends of pipes of greater or less diameter.

Heating a central section of a large pipe so that it may be bent may be accomplished on a shop floor near to or far from the source of high frequency current required. Unit

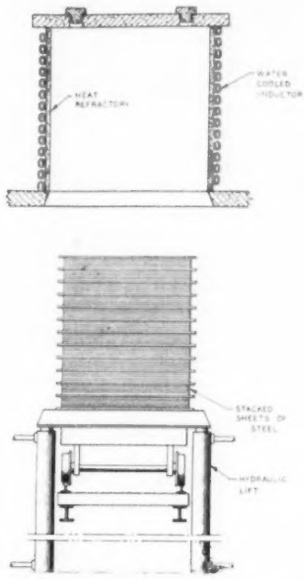


Fig. 5—Arrangement for inductively heating a stack of steel sheets. The stack is raised into the chamber, a tight seal being effected at the base. Copper sheets, nickel plated, are placed at intervals in the stack of steel sheets and comprise the susceptor

lengths, say 40 feet each, of flexible copper conductor are used. To prevent corrosion by oxidation, these flexible conductors are heavily plated with nickel or perhaps chromium. On the flexible conductor, beads of refractory material are strung. To heat a certain length of pipe, say 3 feet, one quickly winds the insulated conductor tightly around the pipe until it is covered with a coil over the length to be heated, as shown in Fig. 4. The coil is then fed with high-frequency current and any chosen length of the pipe may be heated expeditiously at any desired speed.

The current through the coil may be adjusted to the desired value by selecting a suitable voltage to apply to the ends of the coil. If the high-frequency generator is not at the time supplying any other load, the voltage desired may be adjusted at the generator switchboard. If the voltage of the generator must be held constant, then an auxiliary high-frequency autotransformer may be used. By this means any large diameter pipe may be heated where it rests, in the fraction of an hour.

Copper conducts heat about ten times as fast as steel. This fact may be utilized to heat a stack of steel sheets to 700 or 800 degrees Cent., as shown in Fig. 5. Copper sheets about ⅛-inch thick are selected which are 3 to 4 inches greater in dimension both ways than the steel sheets to be heated. Thus, if the steel sheets are 48 x 36 inches, the copper sheets would be chosen ⅛ x 52 x 40 inches. These copper sheets are heavily nickel-plated. A stack of steel and copper sheets is laid up so that for every copper sheet there will be several steel sheets, the number to depend on the thickness of the steel. In recent tests about eight 1/16-inch steel sheets were used to one copper sheet.

Raised Into Inductor

All sheets are so laid up that their centers coincide. The stack of horizontally placed sheets may be made 3 or more feet high. The copper sheets of this stack will project 2 inches over the edges of the steel sheets. A chamber open at the bottom and lined inside with refractory brick is provided. This chamber on the inside is 2 or more inches greater in its horizontal dimensions than the copper sheets. The chamber is surrounded with an inductor coil, the windings of which lie in a horizontal plane. The stacked pile of steel and copper sheets rest on a refractory bedplate which is carried on a flat topped buggy. This, with the sheets, is rolled on a truck below the reception chamber. A mechanical device elevates the pile of sheets into the chamber which then becomes tightly closed by the refractory base piece on which the sheets rest.

The inductor coil is now energized with 60-cycle current. The copper sheets which overhang the steel sheets now become the susceptor. Heavy currents flow in the periphery of the copper sheets, but not, on account of skin effect, in the edges of the steel sheets. The heat generated in the copper sheets is quickly conducted to the center of these sheets and is given by slow conduction to the steel sheets. If the heating is not conducted too rapidly, the entire mass of copper and steel will come to the uniform temperature desired. The steel sheets may thus be annealed. The heating, of course, is carried on with the chamber filled with an inert gas.

The stack is allowed to cool off partly or wholly while in the chamber. It is then lowered from the chamber and rolled on its buggy from underneath the chamber and a new batch is put in. The copper sheets may be used over and over

again. To prevent the copper sheets from warping as their edges start heating, they are slotted every 6 inches or so to a depth of about 4 inches.

In addition to the inductive processes already described for heating solids may be listed the following which are but a few of those which have been brought to the writer's attention:

Removal of tires from locomotive wheels.

Heating brake drum rims while revolving and being filled with molten cast iron.

Heating ends of valve castings for upsetting and forging.

Heating bolt stock before entering heading machine.

Heating nickel-chrome billets, rods and wire for swaging, reduction by rolling and wire drawing.

Heating ends of shafts to be butt welded.

Heating rings, etc., for making shrink fits.

Heating ball bearing races for hardening.

Heating ends of large diameter billets for upsetting or forging.

Heating tool-steel dies.

Heating central region of disk auto wheels for punching.

Symmetry Is Required

The general character of material to which iductive heating may be best employed may be summarized thus:

The metal pieces to be heated best should have a certain symmetry of form.

Large diameters are favorable to the inductive method.

Magnetic metal is cheaper to heat than is nonmagnetic.

The ratio in economies of inductive to fuel heating increases with increase in the final temperature demanded.

For fast heating, the inductive method is unexcelled.

Localized heating of a part of a large metal piece is most readily accomplished by induction (arc heating excluded).

In preparing for inductively heating solids, the investment costs will involve:

1. Electrical equipment for supplying high-frequency current, motor-generator set with panels and controls.
2. Capacitor units for controlling the power factor of the supply line.
3. Local wiring, busbar installation, and piping for cooling water.
4. The inductor heaters.
5. The design and construction of mechanical mechanism to handle and move the material to be treated.

This last factor will add a considerable engineering charge. Unlike melting furnaces, there is no possibility of standardizing the heaters. Each and every case needs special consideration, specially arranged inductors, and individually designed handling mechanism to meet local conditions, quantity, size and shape of material to be heated and temperature requirements.

The electrical equipment to supply (in most cases) the needed 1000-cycle current and the capacitor units for adjusting power factor may be standardized and will serve equally well for the melting of metals and for heating metallic solids below the melting temperaturfe. Where an electrical equipment for melting is already installed, the additional expense for inductors, etc., is small to make the equipment adaptable to the heating of solids. In conclusion, attention might be called to the more or less permanent character of all equipment used for either melting metals or heating solids. Unlike other methods of heating, the only element which becomes overly hot is the material treated, and hence no deterioration or destruction from heat can occur to the installed equipment. The investment cost for inductive heating is high, but the equipment is usable, without major repairs, for many years and should pay for itself several times over before it is ready for discarding.

Testing Society Committees Approve New Standards for Steel Products

AMONG recommendations made by subcommittees and approved by the committee on steel at spring group meetings of the American Society for Testing Materials at Hotel New Yorker, New York, March 6-10, was the advancement to standard classification of tentative specifications for structural rivet steel. Further important action taken by the steel group was the approval of a special committee to consider the possibility of combining all rivet specifications into one, embracing all the necessary categories of rivet steel.

Committee A-1 on steel, approved various other recommendations covering specifications which will be voted on by the entire committee and submitted to the Society at its June meeting in Chicago. Approval was made of a new tentative specification for heat treated carbon steel elliptical springs; favorable opinion was voiced for adoption as standard of tentative specifications for lap-welded and seamless steel and lap-welded iron boiler tubes.

Revise Track Accessories

The subcommittee on steel rails and accessories had recommendations approved for tentative specifications for soft steel track spikes and revisions for steel tie plates which involve provision for copper requirements when copper steel is specified.

Subcommittee on steel forgings and billets approved tentative specifications for normalized and tempered alloy steel forgings for locomotives, requiring a minimum yield point of 55,000 pounds per square inch for class A forgings and 58,000-pound minimum for class B forgings.

Stenciling, rather than stamping, specified markings on plates and sheets under ¼ inch in thickness for boiler and fire-box steel for locomotives and stationary service of a like nature, was favored by the committee on boiler steel, which also approved a revision that specifications shall apply on material not more than 2 inches in thickness.

Changes in size tolerances were approved for commercial hot-rolled bar steels, commercial cold-finished bar steels and cold-finished shaftings, bringing these products in line with manufacturers' standard practice.

To Publish Welding Data

Subcommittee on steel for welding approved a recommendation that a list of specifications suitable for fusion welding appear in the 1933 book of standards and tentative standards. The committee also approved advancement to standard tentative specifications for steel plates of flange and firebox qualities for forge welding, also steel plates of structural quality.

Accepting a new definition for muck bar, a definition reading "a bar drawn from a squeezed bloom," the committee on wrought iron urged the adoption of other revisions, including specifications covering staybolt, engine-bolt and extra-finished wrought iron bars by which these specifications be advanced to standard. This committee also recommended that fabricated pipe specifications be modified to include requirements for wrought iron pipe.

Replies to a questionnaire from 43 of 68 companies indicated almost unanimous agreement in urging standardization of test specimens for both Charpy and Izod methods in the development of impact testing of metals. Demand for standardization of a round impact specimen and for a calibration method also was shown in discussion by the committee for impact testing.

The proposed standard grain size chart for classification of steels was approved for publication by the A. S. T. M. committee on standards.

Rivets of 18-8 Chrome-Nickel Steel Finding Use in Hull Construction

AS A MEANS of combating corrosion of rivets in ship hulls, some application has been made of 18-8 chrome-nickel steel rivets. Several shipyards are known to have utilized rivets of this material in small vessels such as tankers and the United States navy has made some use of them in repairing hulls of S-class submarines. Thus far, no service reports have been issued.

In the meantime, certain general information in connection with the manufacture, heat treatment and driving of these rivets is of interest. According to engineers of the Republic Steel Corp., Youngstown, O., one manufacturer of the product, rivets of 18-8 stainless iron and steels, intended for resistance to wet corrosion, should be manufactured from material which has been thoroughly inspected. All seams, flaws or rolled-in scale are objectionable, for they are liable to open up or become embedded in the rivet during the forming or upsetting operation.

Should Be Pickled

To inspect properly any rivet material, it is necessary to pickle and remove all surface scale, thus making it possible to observe the defects. The stock should be cold drawn, reannealed and skin passed in the case of cold upset rivets, but for hot work should be supplied with a pickled surface.

Rivet holes in plates may be punched or drilled; if the former method is used, the holes should be reamed to remove strained or distorted steel. If plates over ½-inch thick are used, the holes should be chamfered or slightly countersunk to insure a rounded corner under the finished head of the rivet after driving.

Rivets should be heat treated to produce a fine structure of maximum toughness and impact strength. An upsetting test also is desirable. This test consists of supplying a specimen of the full size of the bar, and should withstand upsetting from a length 1½ diameters to ½ diameter without cracking, when heated to driving temperature which is approximately 2100 to 2200 degrees Fahr.

Small rivets up to and including ⅝-inch may be heated or upset cold; larger rivets should be driven very hot and if possible finished about 1800 degrees Fahr. If subjected to working under this temperature, the metal becomes very tough, does not flow readily and has a tendency to work harden. Also, its resistance is decreased, if subjected to severe corrosion.

All rivets for hot driving must be heated very carefully and to the proper driving temperature. Heating should be done in a muffle-type furnace with pyrometer control, if possible. Rivets should not be permitted to remain in the furnace for a longer period of time than to heat thoroughly. Rivets heated by electrical resistance are more satisfactory, as the heating time is shorter and scale will not form as readily as would be the case in either a forge or muffle-type furnace.

The use of a large hammer or bull, and rapid working, are essential for reasons explained previously. In hard driving with a pneumatic hammer, it may be necessary to heat to between 2200 and 2250 degrees Fahr. in order to finish above 1700-1800 degrees.

According to the Republic engineers, these general directions are to be considered only as a guide, as various shop conditions alter the method of application. It is explained, however, that if average consideration is given throughout, results should be satisfactory.

Bulkhead Built of Sheet Piling

AN UNUSUAL installation of steel sheet piling has been completed along Wesley lake, which separates Asbury Park and Ocean Grove, N. J. On the Asbury Park side 2580 lineal feet were constructed, along a curved

line throughout the entire length. On the Ocean Grove side about 1790 feet were installed, the entire improvement being carried on in connection with the construction of two reinforced concrete foot-bridges spanning the lake between the two municipalities.

The coping or cap for the wall consisted of 6-inch channels bolted to the piling, with the cap bent to the required curvature on the job by means of specially designed clamps and jacks. On either side of each bridge for a length of 100 feet, the bulkhead required longer sheet piles, ranging from the usual length of 8 feet, 6 inches to 16 feet, in order to have the same penetration below grade and to grade the top of the bulkhead gradually to the level of the bridge walls. Design and construction of the project were under supervision of Niart Rogers, civil engineer, Asbury Park.

Welding Methods Point Way to Design Economy

Cutting costs by redesigning is the theme of a new book, *Designing for Arc Welding*, published by the Lincoln Electric Co., Cleveland, and edited by A. F. Davis, vice president of that company. The 416-page volume contains the prize-winning papers submitted in the $17,500 second Lincoln prize competition. The published papers are those judged best from some 400 submitted.

Five sections cover machinery, shipbuilding, buildings and bridges, large containers, pipe and fittings. In each case fundamentals of design are explained to make them applicable to other industries. Each chapter is by an authority in that particular field. The total represents the important contributions of welding to industry over the past two years. The papers cover the subjects in great detail and are profusely illustrated.

The competition which called forth these papers was set up by the Lincoln company. The jury of award was made up of members of the electrical engineering department of Ohio State university, Columbus, O., under the chairmanship of E. E. Dreese, head of the department.

The book may be obtained from STEEL, Cleveland, for $2.50, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Junk Autos Dumped in Sea To Reinforce Jetties

Answering the dual purpose of providing a means of disposal of junk automobiles and reinforcing stone jetties which protect beaches from being washed away in storms, old and decrepit cars are being purchased, stripped of their bodies and dumped in the sea alongside jetties which are built several hundred feet out from the beach at Longport, N. J., 6 miles south of Atlantic City. Sand and small stones wash in around the steel frames of the departed machines and form a solid mass which effectively combats sea and weather attacks upon the piers.

Making the Most of

METHODS AND MATERIALS

A MIDWEST manufacturer recently purchased a number of large-diameter heat-treated steel worms having a short threaded section on one end. Inspection revealed that on several of these worms the threads tapered toward the worm section by an amount sufficient to make them unserviceable. The cost of the worms was approximately $30 each, making it particularly desirable that they be salvaged rather than scrapped. Happily, a solution was found in rechasing the threads undersize in a lathe to eliminate the taper and then applying a light chromium plate to bring them up to specified dimensions. Cost of rechasing and chromium plating amounted only to about $2 per worm.

S S S

Wire ropes and cables of corrosion-resisting steel are being made commercially and give much longer life than ordinary carbon steel for use in corrosive atmospheres. In a coal mine described as upcast, hot and moderately dry, two corrosion-resistant winding ropes each lasted 42 months, while three ordinary steel ropes gave service for 16¼, 23 and 15½ months, respectively. In another mine, upcast, very hot and saturated, a corrosion-resistant cable endured for 42 months, as compared with 29, 13 and 9½ months respectively, for three ordinary steel cables.

S S S

MANY examples exist to demonstrate the importance of removing films of dust and grease from lighting units. In one case in a somewhat smoky machine shop a diffuser when new produced over 12 foot-candles of illumination on the workbench beneath. After weeks of neglect this diffuser had become so dirty that less than 3 foot-candles finally resulted, meaning that the cost of light on the work had quadrupled. It meant that out of every dollar spent for electric power and lamp bulbs, 5 cents was being wasted.

S S S

Any of the commercial metals which are available in the form of wire, including lead, tin, zinc, aluminum, copper, brass, bronze, steel, iron, cadmium, and a number of others can be sprayed by means of the spray gun. Sprayed on in a molten condition, they may be built up to any desired thickness on practically any material. They form a firmly coherent, or under special conditions, a separable coating on any substance metallic or nonmetallic. Wood, fiber, glass, or clay products may be coated just as successfully as metals.

S S S

From exposure tests it has been determined that the thickness limit for the satisfactory X-ray examination of steel with the present 300,-

000-volt equipment is 4¾ inches. However, when tube design will permit operation at higher voltages, this thickness limit will again be increased materially and production X-ray examination of steel up to 6 inches in thickness may be expected.

S S S

Using a new type cylindrical grinder, a Chicago manufacturer reports a 100 per cent increase in the production of shafts.

S S S

The value of a trained traffic department is illustrated by the experience of a southern foundry. Until a few years ago, one of this company's plants was using three motor trucks. Application of skilled management, however, made it possible to eliminate this fleet and replace it with one regular trucker and one emergency truck, although shipping is said to have increased 50 per cent. The company reports having cut over $18,000 from its draying cost by the consolidation of shipping with the use of trap and pool cars.

S S S

In one plant a 30-inch gear was broken badly. Spokes were cracked at the hub, the hub was cracked through the center, the rim was cracked in three places and five teeth were broken out. Its condition seemed almost hopeless, but the management was pressed for time and decided to have the gear oxyacetylene welded. The job was done successfully and the machine was back in operation 12 hours after the gear had broken. The cost of the repair was much less than the price of a new gear.

S S S

CAST iron containing 15 per cent chromium is being used increasingly where resistance to oxidation and abrasion at high temperatures is required. Stoker bars of this alloy have been in service for six months without sign of oxidation. Automobile brake drums of this alloy also promise success. In castings of comparatively heavy section, where brittleness is not objectionable, cupola iron with carbon as high as 3.5 per cent can be used. For thinner sections, it is desirable to have a lower carbon content, which in some cases necessitates the use of the electric furnace in producing this alloy.

S S S

In connection with electric arc welding coated weld rods are used widely for stabilizing the arc and providing a gas envelope between the arc and the atmosphere. Carbon monoxide is one of the gases in this envelope and is an active poison, but may not exist in dangerous quantities if the operator is careful. With some coatings there are compounds of fluorine released that can cause violent sickness. Industrial damage suits are pending as a result; consequently it is advisable to be informed as to the possible toxic effects of the gases produced by the coating of welding wire.

IMPROVING OPEN-HEARTH FURNACE DESIGN

BY WILLIAM C. BUELL JR.

Part IV—Mechanics of the Roof

(Twenty-Fourth Article of Series)

DATA of Table XLIX disclose that buckstays consisting of two 5 x 15-inch slabs will be over-stressed if used as the back binding of the semirigid type 150-ton furnace or either the tie rod or semirigid types of the 350-ton furnace.

While the use of two 6 x 15-inch slabs will prove amply rugged for use with either of the binding types in the 150-ton furnace, they probably will prove unsatisfactory if used with either type of binding for the 350-ton unit. However, buckstays of three 5 x 15-inch slabs will meet all conditions of the 150 or 350-ton furnace employing either type of binding.

Open-hearth designers appear almost unanimous as to the desirability of the 15 inch buckstay depth. While the addition of 3 inches at the front of existing furnaces might bring the clearances of the charging equipment to unsafe limits it is thought that in new plant design, 3 inches added width at the front can be secured without difficulty. It is suggested that consideration be given the use of 18-inch deep buckstays on account of the considerable increase in the relative section modulus that is found in the deeper section.

Requires Ample Strength

Buckstay sections, combinations and designs obviously should be selected to develop ample strength and to best resist thermal effects at the lowest cost. In nearly all cases it is thought that the rolled-steel slab will prove the most satisfactory arrangement. The laminated buckstay, which offers some structural advantages, is costly and doubt exists whether its advantages compensate for the higher cost. However, laminated buckstays have the same properties as slab buckstays of similar dimensions and the only factor entering into design that differs with the slab is the cost. The ratio of cost of slab to laminated buckstays is as 1.0 to 1.65.

The cost per foot per section modulus for the 15-inch deep section is constant at 2.61c, as shown in Table L, and 2.17c for 18-inch deep slabs, thus indicating the inherent economy of the deeper section. The costs are figured at 1.92c per pound for slabs, cut to length and bent in the case of the back components.

Buckstays as Columns

If the suspended type roof is used buckstays are subjected to a considerable columnar loading in excess of the weight of the top binding steel, the doors, their rigging and movement which are relatively insignificant in effect. The suspended type roof is without question the best design method and will be discussed to the exclusion of other types, since it produces the maximum loadings.

The least radius of gyration, r, of the various buckstay sections is shown in Table XLVII to be 3.04 in the minimum and 5.16 in the maximum example, but rather closely grouped at about 4.3 in the more desirable arrangements. If the length of the buckstay of the 350-ton furnace, 21 feet 3 inches is assumed as a maximum, then the ratios of $\frac{l}{r}$ for the three values above enumerated will be 84, 49.6 and 59.5 respectively based on the assumption that the buckstays are without support throughout their length. As a matter of fact, in nearly every case, the cast panel plates at the furnace front and back, extending upward at least 6 feet offer a great support and in effect the buckstays are much shorter than the length ascribed resulting in proportionate reduction of the ratio of $\frac{l}{r}$.

Accordingly, it is safe to predict that in no case will that ratio exceed 60 which is the highest value allowable for the maximum structural compressive unit of 15,000 pounds per square inch.

Load Value High

By referring to item s in Table XLV it will be seen that the 60,250 pounds loading from the roof to the back wall buckstays of the 350-ton furnace is of the highest value of the demonstration cases and is not likely to be exceeded under any condition. To this must be added the weight of the steel of the top ties both transverse and longitudinal, the buckstays themselves and the weight of any other components are carried on the buckstays. An ample allowance for such weights would be about 27,000 pounds placing the buckstays under a total columnar action of 87,250 pounds.

If for the sake of consistency the usual compressive value of 15,000 pounds is reduced to 9000 pounds per square inch it thus is apparent that an effective columnar area of slightly less than 10 square inches is necessary to safely support the heaviest loading. Or as not less than 6 x 18-inch slab sections having an effective area of 218 square inches should be used on the 350-ton furnace, the loading would be only about 400 pounds per square inch which would be of little or no importance in the design factors of the buckstays as columns, excepting in the case of

Table L

Properties and Cost of Slab Buckstays

Slabs per buckstay	Slab size, inches	Combined Properties: Area sq. in. A	Moment inertia I	Section modulus S	Radius gyration r	Weight per foot	Cost per foot	Cost/ft./S
2	4 x 15	120	2250	300	4.335	408	$7.83	$0.0261
2	4 x 18	144	3888	432	5.202	490	9.41	0.0217
2	5 x 15	150	2814	375	4.335	510	9.80	0.0261
2	5 x 18	180	4860	540	5.202	612	11.75	0.0217
3	5 x 15	225	4219	562	4.335	765	14.70	0.0261
2	6 x 15	180	3375	450	4.335	612	11.75	0.0261
2	6 x 18	216	5832	648	5.202	734	14.08	0.0217
3	6 x 15	270	5062	675	4.335	918	17.63	0.0261

an unbelievable deflection in the buckstays from other causes.

In the case of the 150-ton furnace the maximum weight to be carried would be 76,280 pounds, DF_2+, Fig. 40-D. Assuming 6 x 15-inch slabs, having an effective area of 180 square inches the value would be less than for the 350-ton furnace.

This discussion develops a fact which may be stated as a rule to the effect, the buckstays properly designed in accordance with the values of stress as herein stated, will inherently be of sufficient rigidity to amply support the normal maximum loadings of the furnace without material deflection provided proper precautions are taken in design to prevent excessive thermal effect.

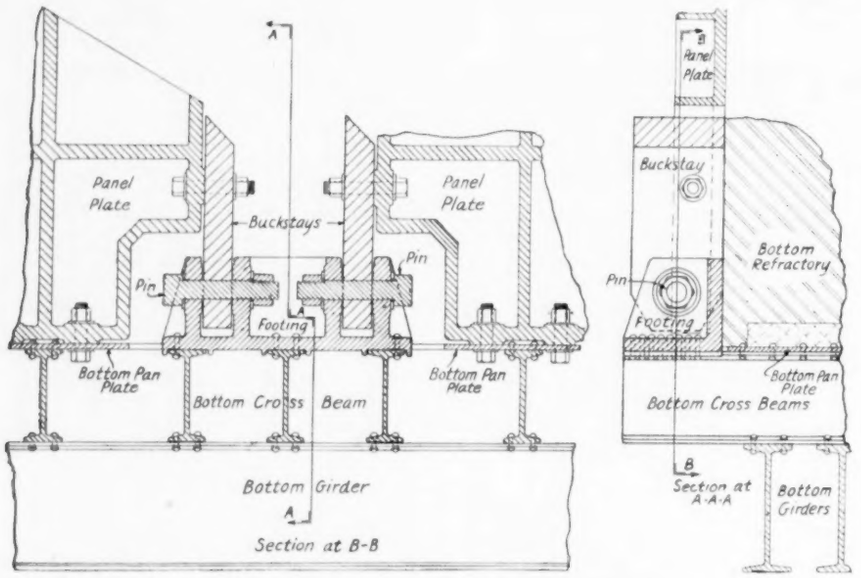


Fig. 42—Arrangement of pinned footing for buckstays

The preferred design includes cross beams immediately under the furnace bottom and atop and at right angles to the supporting girders, thus allowing the girders to be placed inward from the front and back walls so as to remove danger of damage from overflowing or dripping slag or metal. The cross beams must be as long as the overall width of the furnace in order that the buckstays and the cast-panel plates between the buckstays may rest thereon. This causes the crossbeams at their ends to assume a cantilever effect.

Such a design method is found in furnaces A, C, E, G, H, I, J, N, and O, Fig. 21, although in the cases of furnaces A, G, N and O the cantilever effect is somewhat modified by the method employed for the supporting of the buckstays on the beam.

In the typical designs A, B, C and D in Fig. 39, the problems in a cantilever of perhaps 2 to 2½ feet is simple even with the entire roof loading bearing on the beam ends, but with a cantilever of possibly 5 feet as in the case of designs E and F, the problem may present some difficulty in its satisfactory solution, especially if the roof loading be included. To demonstrate this point assume the back buckstay of the 350-ton furnace represents the maximum condition likely to be encountered in any practice. The usual bent buckstay type Fig. 41-D with a 2-foot cantilever and a concentrated loading at the end of the beam of 87,250 pounds develops a bending moment of 2,095,000 inch-pounds; the improved design, type F Fig. 41, with a 5-foot cantilever and a concentrated loading at the beam ends of 98,500 pounds develops a bending moment of 5,910,000 inch-pounds. At the usual 9000 pounds value of fiber stress the required section moduli will equal 233 and 657 respectively.

Usage indicates 15-inch beams are desirable for bottom members; sections of this 15-inch size are found in furnaces A, C, E, G, I, J, N, and O, Fig. 21. Grouping more than three cross beams as the support for a pair of buckstays is structurally inconvenient. Assuming that three beams will be used to support a pair of buckstays, then the single unit section moduli necessary will be 78 for the 2-foot and 219 for the 5-foot condition.

Holding to the 15-inch depth of cross beam, inspection of the structural hand books will develop that in the first case three of any of the standard 15-inch I-beams heavier than 60.8 pound size have ample strength while in the second case three beams having characteristics equal to the 15-foot 147-pound Bethlehem girder would be required to support the buckstay loading.

For a 150-ton furnace built to the specifications as developed in this treatise, and using the loading conditions, $DF_2 +$ of Figs. 40-D and F, and the moments of Figs. 41-D and F, the minimum section moduli will be 192 and 553, respectively, for the 2-foot and 5-foot cantilever. With three unit beams for each pair of buckstays the requirements of the individual section moduli will be about 64 and 185. These properties will be found in the 15-inch 50-pound I-beam and the 15-inch 127-pound Bethlehem girder.

Much better practice is to develop a footing for the back wall overhang of types E and F in Fig. 41 that will so distribute the weight as to give in effect an evenly distributed loading over the cantilever and which will cut the maximum moment and contingently the required section modulus in half. A design, to interconnect both legs of the buckstays at their bottom and thus distribute the weight may be accomplished easily.

The moments shown in connection with the back wall cross beams of types Fig. 41-E and F, are calculated on this basis. With three cross beams in support the combined section modulus required is just less than 100 in each beam. By making proper use of the footing design as a stiffener, the 15-inch 75-pound standard I-beam will serve properly.

Restraint of Buckstays

Examination of the diagrams of Fig. 40 show the outward horizontal forces to be nominal at R, FR and BR, the bottom of the buckstays. They are greater, however, in the top tie rod type of similar loadings but nominally they must be restrained. Methods now in use vary widely. Fig. 21 shows bottom tie rods used with furnaces A, F, G, N and O; rolled channels laid flat with the buckstays coped thereunto in furnaces D, H and M; rolled angles at the outside only, furnaces E and K; rolled angles at both sides of the buckstays, furnace I; cast-steel angle at the outside only, furnace J; and, cast-steel saddles with the buckstays pinned therein, furnaces C and L.

The first and last mentioned arrangements are flexible and, therefore, allow without strain the slight bending movements of the buckstay system which at times must be present in any structure subject to the thermal effects inherent in the open-hearth furnace.

On account of structural limitations it probably is impossible to develop a tie at the bottom of the buckstays of sufficient rigidity to maintain them in exact original relation to the substructure even should such rigidity be desirable. It must be evident when the buckstays have angle or similar connections riveted or bolted to those members and the substeel that movement of the buckstays to or fro must over-

stress the rivets or bolts, inasmuch as connections of sufficient strength cannot conveniently be developed. For this reason the connections become ineffective and of no particular value except to approximately locate the buckstay bottoms in their position with reference to the supporting steel. Bottom tie rods while offering freedom to slight sideral movement offer difficulties in the maintenance of their correct horizontal position.

The cast-steel saddle and pin arrangement of furnaces C and L offer decided advantages for the bottom fastening of the buckstays. With this design the supporting cross beams are fastened securely together and in proper relation to all other elements and serve to strengthen these beams to a considerable degree by a better distribution of the superimposed weight. The pin allows free rotation of the buckstays as necessary and in this respect does not differ from any alternate existing arrangement other than by the qualification of the word "free." The arrangement offers some advantages in ease of fabrication. The general design of this device is given in Fig. 42.

In considering the horizontal reactions at the end of cross beams, both ends are considered as reacting without reference to the other. It is thought that the loadings resulting from the weights of the bath, hearth, back wall and front wall and the restraint from the riveting together of the bottom grillage are sufficient to reasonably permit unrelated calculation.

Conclusions

The use of deeper roof brick offers substantial economy by favorably affecting all cost factors of operations, fuel, upkeep and capital. In several instances insulated roofs are giving excellent service and results. Experiments with insulation should be extended and continued aggressively and with the application of a thorough understanding of the properties of the materials involved will prove successful and developed worthwhile economies.

Certain developments now going forward in the manufacture of chrome brick present the probability of marked improvement in roof refractories. Several partial roofs are now under heat and the success of this material will alter present open-hearth furnace design and operating technique to a considerable degree.

The theoretic unstability of the roofs in several of the newer furnace designs warrants the conclusion that basic arch design is not generally understood or at least is not applied in this practice. A better understanding of the underlying principles and their correct application in the several cases subject to criticism in this respect, would bring about a longer roof life with a lower roof cost per ton of ingots.

Careful detail redesign of the skew system in the case of several of the newer furnaces likely would produce a larger number of heats to the campaign.

The semirigid type of buckstay binding, which is successful wherever used, is making progress towards general acceptance much too slowly. This type of binding correctly designed, frees the furnace brickwork of compressive loadings of magnitude that must be ever present with the tie rod type. The use of the older design is obsolete.

Cross beams at the furnace bottom at right angles to and atop the supporting girders generally should be used because they permit the installation of the bottom girders in a position where they are not subject to weakening damage from overflowing slag and metal. They also offer a considerable advantage in the ease of design and fabrication of the entire furnace binding system.

(To be continued)

Seismic Braced Building Is Safe

THE 13-story arc welded seismic braced Edison building, new general office building of the Southern California Edison Co., Los Angeles, suffered no damage as a result of the repeated earthquake shocks on the Southern California coast two weeks ago.

A report to this effect was received by the Lincoln Electric Co., Cleveland from the company's structural engineer, H. H. Tracy, who with a paper on the design of this building won third prize of $1500 in the second Lincoln arc welding prize competition in 1932. This paper, which is included in the new book "Designing for Arc Welding" published (p. 27) by the Lincoln company, points out that welding increased the strength and rigidity of the structure and was far less expensive than other forms of seismic bracing.

Main Frame Riveted

The building, consisting of 13 office floors and 3 penthouse floors, is a class A structure with riveted steel frame and arc welded seismic bracings. At the time of construction, the Los Angeles building code did not permit dead or live floor or roof loads to be supported by welded connections. For this reason it was necessary to use riveted beam to column connections and column splices.

As the welded beam to column moment connections were much stronger than these riveted connections, practically all the rivets used in the building could have been omitted without in any way impairing the strength of the structure. Moreover, due to the inevitable flexibility of rivet connections, it would be necessary for the welded connections to fail before any appreciable load would be taken by the riveted connections.

The structure was designed to resist shocks comparable to those produced by the San Francisco earthquake of 1906. The recent quakes provided a rigorous test of the engineering design and proved the safety of the building.

Booklet Tells User How To Make Carbide Tools

Complete instructions for a simplified method of manufacturing cemented tungsten carbide (Carboloy) tools in the user's plant are contained in a new 16-page booklet published by Carboloy Co. Inc., 2481 East Grand boulevard, Detroit, distributed upon request to all interested manufacturers. Under the plan outlined in this publication the user purchases only the tool tip or blank —at a price considerable less than the finished tool cost—and makes the balance of the tool in his own plant. He thus obtains a substantial saving in initial investment cost, and further employs his own labor—both desirable features under present conditions.

In addition to these economies a greater flexibility of use is made possible by the development of a method which may be used to remove the tungsten carbide tool tip without injury to either the tip or shank. Thus a single tip may be used for several different jobs and the initial cost distributed over a wider range of work. Detailed instructions in the new booklet cover machining of the tool shank and brazing the tip to the shank.

Metal Spray Solder Melts At a Low Temperature

A new low-temperature solder for tinning steel, iron, brass, copper, etc. at a temperature lower than the boiling point of water has been perfected and placed on the market by the Advance Engineering Co., Duncannon, Pa. It is for use in connection with this company's new metal spray apparatus.

Because of the low temperature at which this new solder may be applied there is no danger of warping the metal being tinned. The new solder is particularly adapted to building up surfaces.

CABINET type of clothes dryer, gas heated. These cabinets are made of Nos. 24 to 26 gage galvanized sheet steel, in various sizes weighing 175 to 500 pounds

LARGE USES OF STEEL IN SMALL WAYS

239th Article ◆ Clothes Dryers

EYES of architects and builders recently were turned toward one of the finest residential apartments erected in Chicago, in which 256 individual steel clothes dryers were installed—one for each apartment. A smaller number of installations have been made in many apartment houses throughout the country, but this was one of the first of the large size modern structures to be equipped with this convenience for every family, and according to all accounts the owners have found it to be one of their strongest drawing cards.

The installations heretofore have been mainly in the basements of apartment houses, for the use of individual families, or collectively. Now the dryers have been made so compact that they occupy little more space than a kitchen range, and not as much as some ranges, and manufacturers are selling them for use in private homes. They believe that in due time a dryer will be given its place in millions of small homes, the same as other labor saving devices.

The dryers for individual family use are made of galvanized sheet steel, Nos. 24 to 26 gages, and weigh 175 pounds, practically all steel; so that the 256 units installed in the Chicago apartment contained in the aggregate nearly 32 tons. At the same time a number of smaller apartments were built, fully equipped with dryers. The tonnage of steel thus used was steadily mounting up to the time when building construction throughout the country was restricted. The total amount of steel used by all manufacturers of clothes dryers in recent years is indefinite; one maker estimates it as running into thousands of tons, including installations of all types, for homes, apartments, hospitals and laundries.

The weight of dryers for domestic purposes ranges from the 175 pounds up to 500 pounds. The lighter individual unit which makers now are seeking to establish in homes is 5½ feet high, 12 inches deep, and 3 feet wide. This type has capacity for hanging 33 lineal feet of clothes.

New Theories on Drying

In normal times when the majority of families had money to spend for household conveniences, one of the chief resistances to sales was not so much the price of the product, but in the age-old belief that nothing dries, whitens and freshens clothes so well as air and sunlight. Makers have endeavored to incorporate in dryers features to overcome these objections. One says:

"Clothes dried by the sun and wind will bleach because the heat of the sun and the moisture in the clothes creates a chemical change with forms ozone. In this dryer heat and moisture are so controlled that ozonated air is formed and actual sun drying conditions are created. The heating and ventilating drives the heated air to the top of the dryer, and through the clothes, the same way the sun penetrates."

An electric heating element is placed within a special radiator in the bottom of the dryer. The ventilating system creates a strong down draft which pulls the heated air from the top of the dryer back through the clothes to the bottom of the dryer. This vaporized moisture-laden or heavy air is drawn through the electric heating element. No flue is used with the electrically heated dryer. Similar types are gas-heated, and others by steam pipes.

Will Hold Midwest Power Exposition in Chicago

Renovizing of power will be the theme of the Sixth Midwest Engineering and Power exposition to be held in Chicago, June 25-30. This term is applied to the repairing, remodeling and restoring of power plants by utilizing the improved equipment and supplies available today.

This exposition will be one of the features of Engineering Week which has been arranged in connection with Chicago's Century of Progress exposition. Twenty engineering organizations having a combined membership of over 100,000 have already perfected plans for conventions at this time.

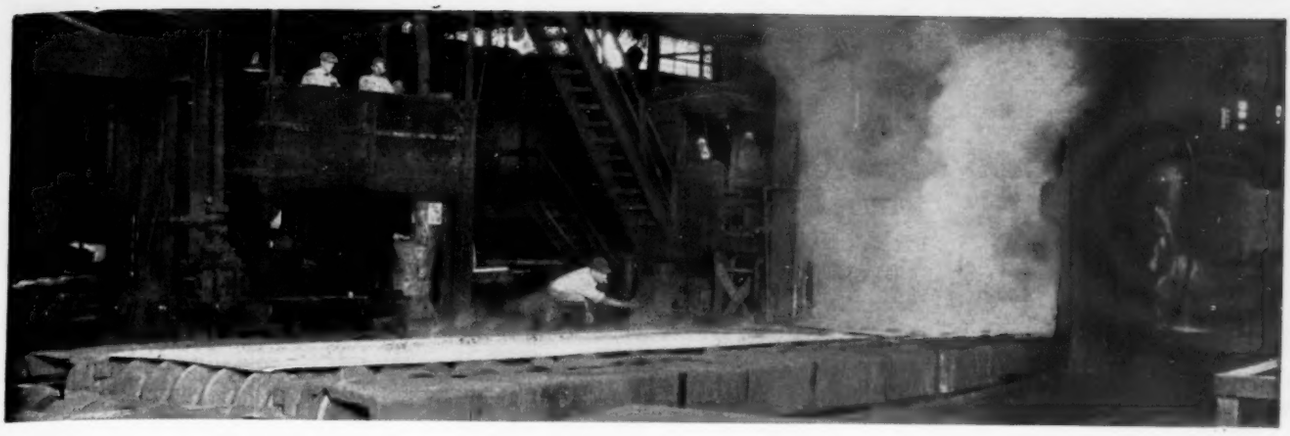
Leaders in the iron and steel industry will discuss their specific problems in relation to present-day conditions with the idea of outlining practical plans for rehabilitation as a good business proposition.

G. E. Pfisterer, 308 West Washington street, Chicago, is director of the exposition.

Piston Ring Has Antifriction Bearing Metal Insert

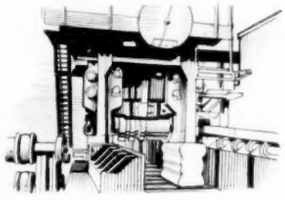
Cast iron piston rings with strips of bronze antifriction bearing metal inserted into and around the circumferential face have been placed on the market by the Skinner Chuck Co., New Britain, Conn., under the name of Gold Seal piston rings. It is claimed that tests have demonstrated the resulting ring surface to be less severe in its action on the protective oil film between the piston and cylinder wall than is the case with rings not provided with the antifriction metal insert. These tests show that the new rings operate with substantially 10 per cent less friction and effect an average fuel economy of 5 per cent, it is reported.

Fred T. Kern Co., 5159 North Lake drive, Milwaukee, has taken up manufacturing and sales rights to a continuous paving machine invented and patented by Arnold Reuss, Milwaukee. Machines for the present will be built at the plant of the Worden-Allen Co., Milwaukee.



PROGRESS IN STEELMAKING

PERFORMANCE of a group of 70 welded steel charging boxes over a 2½-year period of an open-hearth plant in the East gives no hint as to their ultimate campaign. No cracking of the peel ends or pitting of the sides has developed nor has it been necessary to make any replacements or expend any maintenance. Each box 58 inches long, 30 inches wide and 24 inches deep weighs 1000 pounds and originally cost $55.



CORNER ruptures and skin tears on rustless steel ingots are avoided by an Ohio producer by using light drafts in the initial passes during the blooming operation. Reduction is increased 25 per cent following the breakdown passes, the roller aiming to finish at a temperature between 1600 to 1900 degrees Fahr.

♦ ♦ ♦

Water hammering in a hydraulic line at an Ohio plant, caused by variations in pressure, was remedied by substituting a piece of rubber hose for a short section of the pipe.

♦ ♦ ♦

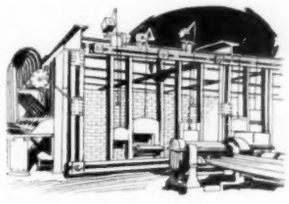
Galvanizing wire by the conventional method involves an anneal in a bath of lead at 1000 degrees Fahr., pickling to remove surface scale, immersion in a bath of zinc and then wiped. By a recently devised technique the lead pan, the lead and its heat input no longer are necessary. Instead, the wire upon being received in the galvanizing department is cleaned and then passed through a bright annealing furnace where it is subjected to a reducing atmosphere. Immediately upon leaving this unit the wire enters the bath of zinc, takes its coating and is wiped at the exit end. Savings of coating wire by the new technique are expected to amount to $1 a ton, compared with methods formerly employed.

♦ ♦ ♦

Stainless strip steel for belt conveyors is being hot rolled at a steel plant in Sweden in lengths up to 400 feet and in thicknesses less than 0.039-inch or about 19 gage and cold rolled in widths up to 31½ inches.

♦ ♦ ♦

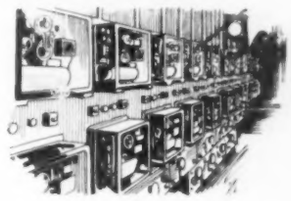
Rust-proofing iron and steel is being executed in Germany by a new method. An insoluble layer of phosphate of exceptional density is produced by treatment in a phosphate solution, the composition of which is not disclosed. The metal free from all dirt and grease is heated from 30 to 60 minutes in the solution which is maintained near the boiling point. The steel then may be subjected to a blackening process followed by light oiling. The process is being used for treating machinery, typewriter and automobile parts, electrical apparatus and screws and springs.



MANY of the most difficult heating problems in steel mill practice have been solved by equipping the heating furnaces with burners designed for controlled luminous flame combustion. Advantages afforded by this type firing include more uniform heating, larger furnace capacity, better control of scale, fuel economy ranging from 20 to 40 per cent, and conversion from coal or producer gas to natural or coke oven gas with minimum furnace alterations.

♦ ♦ ♦

Remote control of a 5-horsepower motor which operates the hydraulic control valve on a 3000-ton bloom shear, has been made possible by a combination of self-synchronous mechanisms and thyratron controlled tubes.



CARETAKERS of pyrometric equipment in steel plants have been relieved from the frequent necessity of balancing the standard cell on potentiometers by the development of a standardizer. This instrument automatically checks the measuring circuit about every 45 minutes, thus freeing the instrument man for other duties.

♦ ♦ ♦

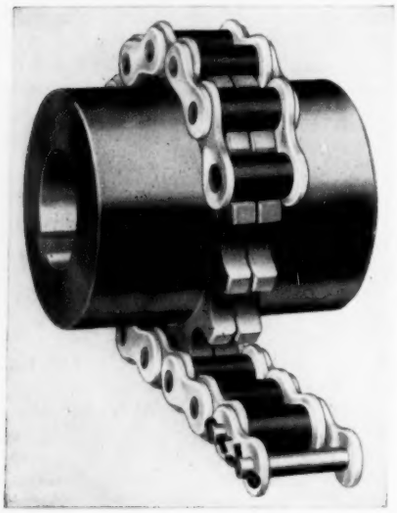
Thickness of steel sheets now may be recorded graphically by a photoelectric unit which operates in conjunction with an electric gage. The recorder is built with a highly sensitive galvanometer which picks up the measurement. A small mirror, mounted on the moving system of the galvanometer, reflects a beam of light into two photoelectric tubes. A pliotron tube amplifies the output of the photoelectric tubes and supplies sufficient power to operate a high torque recording element. The latter follows the galvanometer and without time delay gives a continuous record on the chart.

NEW EQUIPMENT

PRODUCTION FABRICATION TREATMENT FINISHING

Coupling Embodies Sprocket Wheels, Roller Chain

Link-Belt Co., Indianapolis, is announcing a new flexible coupling in which the company's recently developed Silverlink chain will be employed. The unit, shown herewith, consists of two cut tooth sprocket wheels or coupling halves, and a piece of roller chain to connect them.



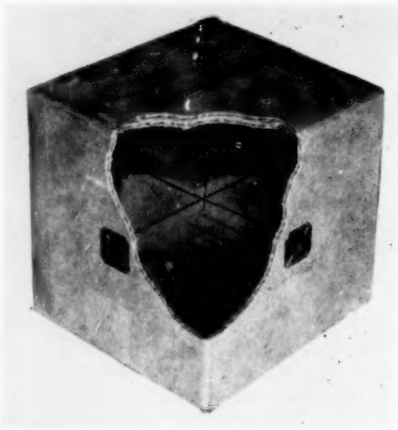
Link-Belt flexible coupling employs chain with pin and cotter link

All working surfaces are machined to close tolerances. A pin and cotter link makes it easy to couple or remove the chain when desired. Where operating conditions suggest the advisability of protection from dust, dirt or other adverse conditions the coupling can be enclosed in either a stationary or revolving automatically-lubricating casing.

◆

Fiber Container Supported By Wire Stays

Nelson Corp., Standard Oil building, Baltimore, recently announced a fiber container for shipping small metal products such as nails, brads and galvanized articles. To prevent bulging under pressure from shifting load or when stacked, the box shown herewith, is wire-stayed. Each of the four side walls are held in constant perpendicular plane by wire stays running from the center of one wall to the center of the opposite wall. Thin metal plates



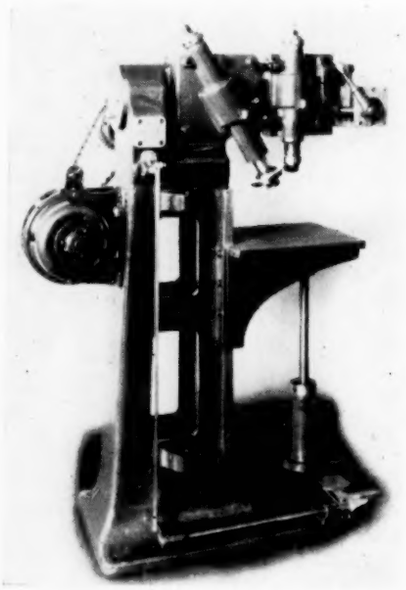
Wire-stayed fiber container is marketed by Nelson Corp.

on the outside of the container walls secure the ends of the stays. The box itself is of the regular slotted type, made of corrugated or solid fiberboard.

◆

Develops Vertical Beading, Trimming Machine

McKinney Tool & Mfg. Co., 1688 Arabella road, Cleveland, recently brought out a vertical beading and trimming machine on which medium and large drawn shells can be



McKinney beading, trimming unit handles wide range of sizes

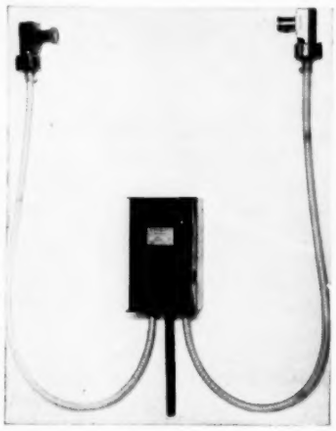
trimmed rapidly without expense of special tooling. The drawn shapes do not need to be round, but can be of any shape providing the inside corner radii are not smaller than the small trimming roll.

The handle at the extreme upper right of the machine, shown herewith, operates the saddle carrying the front vertical roll. When this lever is pulled forward the rolls are separated. The shell or part to be trimmed or beaded then is set on the table which has previously been adjusted to the proper height. After the lever is pushed back, bringing the rolls together, the cut starts and the work revolves on the table until the cut is complete. Rolls can be run at a speed of 40 to 60 revolutions per minute for beading stock up to 18 gage and for trimming stock up to 16 gage.

◆

Photoelectric Controller Is Rugged Device

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently announced a light-sensitive control de-



Westinghouse photoelectric unit eliminates intermediate relays

vice adapted to applications such as counting, limit switch, door opening, automatic weighing, and similar operations. The unit is a rugged industrial device which can be actuated by a phototube or by delicate contacts carrying only a few microamperes.

Units, such as the one shown herewith, are assembled in a sheet metal cabinet and are available for any commercial voltage or frequency except direct current.

Steel Rate Rebounds; Markets More Buoyant

Ingot Output, at 15 Per Cent, Regains Previous Week's Loss as Suspended Tonnage Is Released—Industry Set for Gradual Improvement

BREAKING down of the barriers to trade, with the reopening of banks, freer flow of credit, currency and checks, deflation of government costs, rising grain and other commodity and security values is imparting a greatly improved tone to the iron and steel markets.

This surge of confidence throughout industry has not yet resulted in an impressive increase in iron and steel consumption, though it is responsible for releasing practically all tonnage suspended recently; it is impelling consumers to seek protection farther ahead than at any time during the depression, and it is setting in motion mechanism certain to generate larger steel requirements.

Steelmakers are under no delusion as to obstacles still ahead, such as the employment and railroad situations, which must be overcome before vast buying power is re-created. There is a strong feeling, however, that government and industry have passed successfully through a crucial test, and are gaining fresh vitality for the grind of recovery.

To some extent, the trend is already manifest in steelmaking operations, which in the week ended March 18 recovered all the ground lost in the preceding week, and rebounded to 15 per cent. Further expansion seems assured for this week, for the reason reinstatement of suspended automotive requirements came too late to affect the rate last week.

Except in scrap, up 50 cents at Youngstown, no price increases are recorded, but in practically every product the market is stronger, with broader inquiry, so far forward as Oct. 1 in some instances. Producers are loath to commit themselves beyond second quarter. Books on heavy finished steel have not been formally opened, but mills are willing to take business now at present levels.

In a more definite degree, the buoyant note is apparent in demand for raw materials. A merchant furnace interest at Cleveland has booked 5000 tons of pig iron, and 10,000 tons are under negotiation there. The volume of current pig iron business at Chicago is the largest in 18 months. Scrap is more active in all markets.

A greater diversity of orders from miscellaneous manufacturing groups is considered a portent of gradually mounting steel consumption. Railroads still defer buying, awaiting further definition of government policies. Structural shape awards for the week are lower, at 6135 tons. Cumulative tonnage in shapes and concrete bars so far this year is 75 per cent of that in the comparable period last year.

Seasonal buying of cast iron pipe has placed more than 10,000 tons on makers' books within the week; Chicago is inquiring for 10,260 tons; Montrose, N. Y., 2700 tons. Tanks for the Philadelphia Gas Co. require 2600 tons of plates; 2000 tons have been purchased for a floating drydock at San Diego, Calif. A few orders have been distributed for brewery tanks.

Not only in the United States but also in some European countries a better feeling appears to exist in industry, despite the diplomatic distractions of the moment. Iron and steel production in Great Britain gained in February, according to STEEL's cablegram. British steelmakers are reported forming new comptoirs and rumors of demands for tariff increases are heard.

All of STEEL's price composites are unchanged this week; iron and steel remaining $28.35; finished steel, $45.60; and steelworks scrap $6.46.

Composite Market Averages

	March 18	March 11	One Month Ago Feb., 1933	Three Months Ago Dec., 1932	One Year Ago March, 1932	Ten Years Ago March, 1923
Iron and Steel Composite	$28.35	$28.35	$28.31	$28.93	$29.61	$45.31
Finished Steel Composite	45.60	45.60	45.35	46.74	47.09	64.40
Steelworks Scrap Composite	6.46	6.46	6.33	6.41	7.94	23.80

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate pipe. Steelworks Scrap Composite:—Melting steel, compressed sheets.

COMPARATIVE PRICES OF IRON, STEEL AND COKE

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	March 18, 1933	Feb. 1933	Dec. 1932	Mar. 1932
Pig Iron				
Bessemer, del., Pittsburgh	$15.76	15.76	15.76	16.76
Basic, valley	14.00	14.00	14.00	15.00
Basic, eastern, del. eastern Pa.	13.50	13.50	13.50	16.00
No. 2 foundry, del. Pittsburgh	15.76	15.76	15.76	16.51
No. 2 foundry, Chicago	15.50	15.50	15.50	16.50
*Southern No. 2, Birmingham	11.00	11.00	11.00	11.00
**No. 2X, Virginia furnace	17.75	17.75	17.75	18.00
**No. 2 X, Eastern, del., Phila.	13.76	13.76	13.95	15.76
Malleable, valley	14.50	14.50	14.50	15.50
Malleable, Chicago	15.50	15.50	15.50	16.50
Lake Superior charcoal, del. Chi.	23.04	23.04	23.04	23.04
Gray forge, del. Pittsburgh	15.63	15.63	15.63	16.13
Ferromanganese, del. Pittsburgh	73.24	73.24	73.24	80.24

*1.75-2.25 silicon. For local delivery. Northern shipments based on $10, Birmingham. **2.25-2.75 silicon.

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c per gross ton, beginning Jan. 4, 1932.

Coke				
Connellsville, furnace, ovens	1.75	1.75	1.75	2.25
Connellsville, foundry, ovens	2.25	2.50	2.50	3.25
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	27.00
Wire rods, Pittsburgh	35.00	35.00	37.00	37.00

	March 18, 1933	Feb. 1933	Dec. 1932	Mar. 1932
Finished Material				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.55
Steel bars, Chicago	1.70	1.70	1.70	1.70
Steel bars, Philadelphia	1.91	1.91	1.91	1.81
Iron bars, Chicago	1.65	1.65	1.65	1.70
Shapes, Pittsburgh	1.60	1.60	1.55	1.55
Shapes, Philadelphia	1.65	1.70	1.75	1.62
Shapes, Chicago	1.70	1.70	1.70	1.70
Tank plates, Pittsburgh	1.60	1.60	1.60	1.55
Tank plates, Philadelphia	1.59½	1.66	1.77	1.69½
Tank plates, Chicago	1.70	1.70	1.70	1.70
Sheets, No. 10 blue anneal., Pitts.	1.55	1.60	1.70	1.70
Sheets, No. 24, hot ann., Pitts.	2.00	2.00	2.10	2.20
Sheets, No. 24 galvan., Pitts.	2.60	2.50	2.85	2.80
Sheets, No. 10 blue anneal., Chi.	1.70	1.85	1.85	1.85
Sheets, No. 24 hot ann., Chicago	2.15	2.15	2.25	2.35
Sheets, No. 24 galvan., Chicago	2.75	2.75	2.90	3.00
Plain wire, Pittsburgh	2.10	2.10	2.20	2.20
Wire nails, Pittsburgh	1.85	1.85	1.95	1.95
Tin plate, per base box, Pitts.	4.25	4.25	4.25	4.75
Scrap				
Heavy melting steel, Pitts.	$8.75	8.35	8.70	10.25
Heavy melting steel, eastern Pa.	6.50	6.50	7.25	7.35
Heavy melting steel, Chicago	5.25	5.25	5.45	6.75
No. 1 wrought, eastern Pa.	7.00	6.50	7.25	9.00
No. 1 wrought, Chicago	5.00	5.00	5.05	6.25
Rails for rolling, Chicago	7.75	7.75	8.25	9.50

Sheets

Automotive Industry Releasing Suspended Tonnages — More Consumers Seeking to Close

SHEET PRICES, PAGE 37

Pittsburgh—Prices on all grades of sheets are being extended for coverage, where customers desire it, through second quarter. However demand for future requirements has stepped up and there are more small inquiries in the market today than in some time. Some specifications held up by automotive interests are now being released. Prices now quoted call for 2.00c base on black sheets, 2.60c for galvanized and 1.40c for heavy hot-rolled. Heavy and light cold-rolled are 1.90c and 2.30c, respectively, and furniture sheets are maintained on their present basis pending universal acceptance of abolishment of that classification and placing it on a cold-rolled base. Several inquiries are expected to become active for beer kegs, drums and other containers.

Chicago—Inquiry, occasioned to a large extent by talk of higher prices, is more active than orders and shipments. Demand increased slightly the past week following a temporary collapse the preceding week, but orders still are light and consumers are interested more in obtaining price protection than in placing definite orders. Automotive requirements continue restricted, while shipments and operations have yet to regain losses sustained during the banking moratorium. New prices generally are being adhered to on current business.

Cleveland—Chrysler is releasing most of the sheet tonnage and other material on which it suspended shipments recently, and releases from Chevrolet are expected this week. New purchasing for automotive consumption, however, is not anticipated until after dealers' stocks have been reduced. Sheet mills here and in adjacent lake districts were idle during the week, but will resume this week. General inquiries are more plentiful and some contracts have been signed for specific tonnages for the second quarter at present prices. Refrigerator manufacturers are more active. For the Cleveland postoffice, 100 tons of full finished sheets will be purchased shortly.

New York—Better specifications against contracts reflect strength of the new quotations sellers are holding for second quarter.

Philadelphia—While buying is light, consuming interest has improved, sellers generally quoting recently announced prices on all new business, second quarter as well as spot. Protections at old prices should stimulate specifications the rest of this quarter. Blue annealing charges on hot rolled sheets are generally being absorbed by the recently announced width extras.

Buffalo—Sheet purchases continue slow. Buffalo district operations the past 30 days have averaged less than 20 per cent. Spring demand will show considerable improvement.

Cincinnati—Clearing of the banking situation caused a pickup in sheet demand, with manifestations that this will soon be broadened. Present prices are firm and are not quoted beyond the second quarter.

St. Louis—Distinct improvement in demand for sheets is noted, a number of new orders being booked and specifications being larger. Rush delivery is asked on most new orders. Second quarter books have been opened at the following delivered prices: No. 10 blue annealed, 1.89c, No. 24 hot rolled annealed, 2.34c, No. 24 galvanized, 2.94c, No. 28 tin mill black, 2.64c.

Birmingham, Ala.—Production has been kept up sufficiently to meet the little demand that was noted recently, but total output is small. Clearing of banking holiday is regarded as turning point and expectations are expressed for material improvement in trade.

CURRENT FINISHED STEEL PRICES

Delivered prices subject to freight surcharge corrected to nearest ½c. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base..	1.40c
Chi. dist. mills.....	1.50c
Chicago, del.	1.55c
*New York, del....	1.75c
Birm., base	1.55c
*Philadelphia, del.	1.71c

BLUE ANNEALED No. 9-10

Pittsburgh, base..	1.55c
Chi. dist. mills	1.65c
Chicago, del	1.70c
Phila., del.	1.86c to 1.96c
New York, del.....	1.90c to 2.00c
*St. Louis, del.	1.89c
Birm., base	1.70c
San Fran., c.i.f.....	2.32½c

HOT ROLLED ANNEALED No. 24

Pittsburgh, base..	2.00c
Chi. dist. mills....	2.10c
Chicago, del.	2.15c
*New York, del....	2.35c
*Phila., del.	2.31c
Birmingham, base	2.15c to 2.25c
*St. Louis, del	2.34c
San Fran., c.i.f.....	2.85c
Detroit, del.	2.18½c

GALVANIZED No. 24

Pittsburgh, base..	2.60c
Chi. dist. mills.....	2.70c
Chicago, del.	2.75c
Philadelphia, del..	2.91c
New York, del.....	2.95c
Birm., base	2.75c
St. Louis, del.	2.94c
San Fran., c.i.f.....	3.50c

AUTOBODY No. 20

Pittsburgh, base..	2.45c

FURNITURE

Pitts., No. 10 h'vy	2.40c to 2.50c
Pitts., No. 20 light	2.90c to 3.00c

TIN MILL BLACK No. 28

Pittsburgh, base..	2.30c
Gary, base	2.40c
*St. Louis, del.	2.61c

HEAVY COLD ROLLED No. 10

Pittsburgh, base..	1.90c
Chi. dist. mills.....	2.00c
Chicago, del.	2.05c
*Philadelphia, del.	2.21c
*New York, del.....	2.25c

COLD ROLLED No. 20

Pittsburgh, base..	2.30c
Chi. dist. mills	2.40c
Chicago, del.	2.50c
*Philadelphia, del.	2.61c
New York, del.	2.65c

Corrosion, Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold Strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base..	1.60c
New York, del.....	1.70c to 1.80c
Phila., del. .....1.59½c to 1.69½c	
Boston, del.	1.82c to 2.02c
Buffalo, del.	1.85½c
Chicago, base	1.70c
Cleveland, del.	1.78½c
Birmingham, base	1.75c
Coatesville, base..	1.50c to 1.60c
Pacific Coast, c.i.f.	2.00c
St. Louis, del.	1.94c

Structural Shapes

Pittsburgh, base..	1.60c
Philadelphia, del...	1.65c to 1.75c
New York, del.	1.77c to 1.87c
Boston, del. ....1.90½c to 2.00½c	
Chicago, base	1.70c
Cleveland, del.....	1.78½c
Lackawan., base..	1.70c
Birmingham, base	1.75c
Pacific Coast, c.i.f.	2.10c
Do., wide flange	2.20c

Bars

SOFT STEEL

Pittsburgh, base..	1.60c
Chicago, base	1.70c
Birmingham, base	1.75c
Lackawan., base..	1.70c
Pacific Coast, c.i.f.	2.00c
Cleveland, base....	1.65c
Philadelphia, del..	1.91c
New York, del.....	1.95c
Boston, del.	2.02c
Pitts., cold finish..	1.70c
Pitts., forg. qual..1.75c and	1.85c
San Fran., c.i.f.....	2.10c

RAIL STEEL

Pitts., Buff., Chi... St. Louis	1.50c
Eastern mills	1.30c

IRON

Chicago, base	1.60c to 1.65c
New York, del.....	1.85c to 1.90c
Philadelphia, del...	1.81c to 1.86c
Pitts., refined.....	2.70c to 4.20c

REINFORCING

Billet, mill l'gths. Chi., Pitts., Buff.	1.40c
Do Cleveland..	1.45c
Do Detroit	1.60c
Chicago, rail steel	1.30c
*Phila., cut lengths	1.86c

Wire Products

(Prices apply on carload lots. Mixed carloads 10 cents higher with 10% discount off extras; joint carloads 10 cents higher with no discount from extras; pool carloads 20 cents up; less carloads 30 cents up.)

F.o.b. mills, 100 lb. keg

Standard wire nails.....	$1.85
Cement coated nails	1.85
Galvanized nails	3.35

(Per pound)

Polished staples	2.55c
Galvanized fence staples..	2.80c
Barbed wire, gal.	2.35c
Annealed fence wire	2.25c
Galvanized wire	2.60c
Woven wire fencing (base column, c.l.).....	$50.00

(To Manufacturing Trade)

Plain wire, 6-9 ga.	2.10c
Spring wire	3.10c

Chicago and Anderson, Ind., $1 over Pitts.-Cleve.; Duluth and Worcester, $2 higher; Fairfield, Ala., $3 higher.

Cold-Finished Bars, Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.....	1.70c
20,000 to 59,999 lbs.....	1.65c
6,000 to 99,999 lbs.....	1.60c
100,000 lbs. and over....1.57½c	

Chicago, Cleveland, Buffalo 5c higher; Detroit, 20c; eastern Michigan 25c.

Tin and Terne Plate

Per 100-lb. box, Pittsburgh

Tin plate, coke base, contract..	$4.25
Do., stock	3.75
Long ternes, No. 24 unassorted	2.75c

Gary base, 10 cents higher.

Alloy Steel

Hot rolled, f.o.b. Pittsburgh, Buffalo, Chicago and Massillon, O. Base 2.45c to 2.65c. Differentials to various classes of consumers.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.30
2500	2.25	3400	3.20

4100 .15 to .25 Mo.	0.50
4600 .20 to .30 Mo. 1.25-1.75 Ni.	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	0.20
6100 bars	1.20
6100 spring	0.95
Cr., Ni., Van.	1.50
Carbon van.	0.95
9250 (flats)	0.25
9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot-rolled strip up to 23 15/16-in. wide, Pitts..	1.45c
Do., Chicago	1.55c
Do., del. Phila...	1.76c
Do., del. N. Y.	1.80c
Cooperage hoop, Pittsburgh	1.55c to 1.60c
Do., Chicago	1.65c to 1.70c
*Cold roll. strip, Pitts., Cleve....	1.90c to 2.00c
Worcester, 3 tons or over	2.10c

Rails, Track Material

Stand. rails, mill	$40.00
Relaying rails, Pitts., 20-45 lbs.	$20.00 to 22.00
50 to 75	$16.00 to 18.00
80 to 100	$20.00 to 21.00
Light rails, 25-45, mills	$30.00
Light rails, Chi....	$32.00
Angle bars, mills..	2.55c
Spikes, R. R. mills	2.15c
Spikes, boat, b'ge, Pitts.	2.65c
Track bolts, Chi...	3.50c
Do., stand., job.	73 off list
Tie plates, Pitts.	$35.00
Tie plates, Chi.....	$35.00

Rivets, Wrought Washers

Struc., c.l., Pitts.-Cleve.	2.25c
Struc., c.l., Chi.....	2.35c
7/16-in. & smaller, Pitts., Chi., Cleve. .....70, 10 and 10 off	
Washers, c.l., Pitts. dist.	6.50 to 6.75 off
Do., Chi. dist....	7.00 to 6.75 off

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread.....	75 off
Rolled thread ½ x 6 and smaller	75 off
Eagle list	75 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	75 off
Tire bolts .....60 and 10 off	
Stove bolts, 75, 25 and 10 off in pkgs.; 86 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller 75 off.	

NUTS

Semifinished	75 off

HEXAGON CAP SCREWS

Milled .....80-25 off	
Upset 1-in. diam., smaller	80-25-10 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	75-10-10 off
Headless set screws.....75-10 off	
Upset, larger than 1-in.75-10 off	

Cut Nails, Piling

Cut nails, c.l., Pitts.....	$2.50
Do., less carloads, 5 kegs or over	$2.90
Less than 5 kegs	$3.05
Steel sheet piling, Pitts...	1.90c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pittsburgh and Lorain, O., to consumers in carloads, Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago delivered, 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

In.	Blk.	Gal.
Steel		
¼ and ⅜	57	34
½	62	49½
¾	65½	55
1—3	67½	57
Iron		
½	28	10½
¾	33	16½
1—1¼	36	20½
2	38	21

LAP WELD

Steel		
2	61	50½
2½ to 6	64½	54
8	62	51
10	60	49
12	59	48
Iron		
2	26	12½
2½—3½	33	18½
4—6	35	22
7—8	34	21½
9—12	31	16½

(*Please turn to next page*)

STEEL LINE PIPE

Steel

2 to 3 butt	66⅔
2 lap	60
10 lap	59

Iron

2½ to 6 lap	63½
8 lap	61
12 lap	58

Discounts on steel and iron pipe are net.

BOILER TUBES

Carload discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Quantity discounts same as for hot rolled, below. Charcoal Iron—Under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Quantity discounts are: Under 10,000 pounds, 10 points and 5 per cent; 10,000 to 24,999 pounds, 6 points and 5 per cent; 25,000 pounds to carload, 2 points and 5 and 5 per cent; carload and over, base discount and 5 and 5 per cent. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft...55%
Selected lengths, 1—18 ft....53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$32.00-33.00
4-in. Birm.	35.00-36.00
4-in. Chicago	43.40-44.40
6 to 24-in. Chicago	40.40-41.40
6-in. & over, N. Y.	32.00-34.50
4-in. New York	34.50-36.50

Class A pipe $3 higher than Class B.

Stand. fitgs., Birm. base...$90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

RAW MATERIAL PRICES

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c gross ton, from Jan. 4, 1932. Asterisk denotes price change this week

Pig Iron

Per Gross Ton

FOUNDRY, No. 2

Chicago, furnace	$15.50
Pitts., dist. fur.	15.00
Pittsburgh, del.	15.63-16.13
Valley furnace	14.50-15.00
Cleve. fur., local del.	15.00
Philadelphia, del.	13.26-13.76
Virginia furnace	17.25
Granite City, Ill.	16.50-17.00
Buff., fur., local del.	16.00
Buff., all-rail, Bost.	18.91-19.91
Do, Brooklyn	18.90
Do, Newark	17.28
Ala., Bir. fur., local	11.00
Ala., Nor. del., Bir.	10.00
Ala., del. Chicago	16.01
Ala., del. St. Louis	14.42
Ala., del. Cincinnati	13.82
Ala., Phila., dock del.	15.00-15.25
Ala., Balt., dock del.	15.00
Ala., N. Y. dock	15.50
Ala., Bost. dock del.	15.75-16.75
Tenn., Bir. base	13.00
Tenn., del. Cinci.	13.82
Montreal, del.	23.00-23.50
Toronto, del.	22.10

FOUNDRY, No. 2X

Buff., fur., local del.	16.50
Buff., all-rail, Brook.	19.40
Do, Newark	17.78
Buff., all-rail, Bost.	19.91-20.91
Virginia furnace	17.75
Eastern, del. Phila.	13.76-14.26

FOUNDRY, No. 1X

Buff. fur., loc. del.	17.50
Eastern, del. Phila.	14.26-14.76

MALLEABLE

Valley furnace	14.50-15.00
Cleve. fur., loc. del.	15.00
Pittsburgh dis. fur.	15.00
Pittsburgh, del.	15.63-16.13
Chicago, furnace	15.50
Buff., fur., loc. del.	16.50
Eastern Pa., del.	14.63-18.91
Granite City, fur.	16.50-17.50
Montreal, del.	24.00
Toronto, delivered	22.60

BASIC

Pitts., dist. fur.	14.00
Pittsburgh, del.	14.63-15.13
Eastern, Pa., del.	13.50
Buff. fur., loc. del.	15.50-16.00
Montreal, del.	23.50
Valley, furnace	14.00

BESSEMER

Valley furnace	14.50-15.00
Pittsburgh fur	15.00
Pittsburgh, del.	15.63-16.13

LOW PHOS.

Valley, fur., stand.	25.00
Phila., standard	22.76-25.79
Copper bear., E. Pa. furnace	20.50-21.50

GRAY FORGE

Valley furnace	14.00
Pitts. dist. fur.	15.00
Pittsburgh, del.	15.63-16.13

CHARCOAL

Lake Sup., del. Chi.	23.04

SILVERY

Jackson County, O., fur. 6%—$18.00; 7—$18.50; 8—$18.75; 9—$19; 10—$19.50; 11—$20; 12—$20.50; 13—$21.50; 14—$22.50; 15—$23; 16—$24; 17—$25.50.

Pittsburgh and Buffalo furnace: 7 to 10—$19; 15—$21 to $23.

BESSEMER FERROSILICON

Jackson County, O., fur., 10%—$20.50; 11—$21; 12—$21.50; 13—$22.50; 14—$23.50; 15—$24; 16—$25; 17—$26.50.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bess.	$4.80
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63%, con. (nom.)	7.50
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nom.)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.00
No. Afr. low phos.	7.00
Swedish basic, 65%	7.50- 8.00
Swedish low phos.	8.00
Spanish, No. Afr. basic, 50 to 60%	7.00
Tungsten, spot, sh. ton unit, duty pd.	$9.65- 9.90
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton c.i.f.	$15.50-16.50

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	nominal
So. African, 52%...	18 to 19 cts.
So. Afr., 49-51%	nominal
Indian, 48-50%	nominal

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Ala.	$35.00
Missouri	32.00

Second Quality

Pa., Ohio, Ill., Ky., Md.	25.00-30.00
Missouri	26.00
Georgia, Alabama	30.00

SILICA BRICK

Pennsylvania	$35.00
Joliet, E. Chicago	47.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

Burned, 9 x 4½ x 2½	$61.50
Unburned, 9 x 4½ x 2½	52.00

CHROME BRICK

Per Net Ton

F.o.b. ship. point	$42.50

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	38.00
Domes, Chewelah, Wash., base	20.90

Fluorspar

85 to 5 per cent grade

Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$10.50
Washed gravel, import duty paid tide, gross ton	16.50

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.75
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Yong.	26.00
Chicago	28.00

SLABS

Pitts., Cleve., Yong.	26.00

WIRE RODS

Pitts., Cleveland	$35.00
Chicago	36.00

SKELP

All grades, Pitts.	1.50c-1.60c

Coke

Prices Per Net Ton

BEEHIVE OVENS

Connellsville fur.	$1.75
Connellsville fdry.	2.25- 2.50
Connell. prem. fdry.	4.00
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.21- 8.81
Chi. ov., outside del.	7.00
Chicago, del.	7.75
New England, del.	10.00
St. Louis, del.	7.75
Birmingham, ovens	4.00
Indianapolis, del.	7.75
Ashland, Ky., ovens, Connell., basis	4.50
Portsmouth, ovens Connell. basis	4.50
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del.	8.50

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82% tidewater, duty pd. (con.)	*$68.00
del. Pitts. (con.)	* 73.24
Spiegeleisen, 19-20%, dom. fur., spot†	24.00
Ferrosilicon, 50%, freight all., c. l.	74.50
Do, less carload	82.50
Do, 75 per cent	120-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	85.00
2% carbon	90.00
1% carbon	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	9.50
Do, spot del.	10.00
Ferrotungsten, stand., lb. cont.	0.94- 1.00
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.60- 2.80
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	8.50
Do, under 1 ton	9.00
Ferrophosphorus, per ton, c. l. 17-19%, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic per ton c. l., 23-26% f.o.b. Anniston, Ala.; 24%, $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Diff. to apply to quantity.

*Spot, $7 less.

Bars

Quiet Demand Prevails with Prices Extended to Second Quarter—Auto Needs Small

BAR PRICES, PAGE 37

Pittsburgh—Few specifications for alloy bars have been placed following the announcement on price for second quarter made about a week ago. The mill base of 2.45c for the automotive trade and other large buyers was reaffirmed with the market still quoted at a spread up to 2.65c, mill, base for the smaller buyer.

Curtailment in automotive bar buying the past week, both alloy and carbon, has been the most acute since banking restrictions were adopted in Michigan. Protection on carbon bars may be obtained through June at generally 1.60c, Pittsburgh, unchanged from first quarter.

Boston—Midvale Co., Philadelphia has been awarded 200 tons of round 3-inch hot-rolled bar steel for the Boston navy yard at a total of $16,860, delivered. This is grade V material for die lock chain.

New York—The 1.60c, Pittsburgh price is being extended into second quarter, with buying expected to undergo a modest improvement, in view of severe shortage at railroad store houses and at some manufacturing plants.

Philadelphia—With commercial steel bars reaffirmed at 1.60c, Pittsburgh, for second quarter, there is no particular buying pressure. Common iron bars continue 1.50c to 1.55c, Pittsburgh, with better inquiry from railroads encouraging.

Cleveland—With the removal or easing of trade restrictions due to banking difficulties, more miscellaneous orders for steel bars have been placed, though demand from the automotive industry is lacking. Tonnage, therefore, has not improved, and for some makers was less than in the week preceding. Inquiries are more numerous, and some contracts have been closed for second quarter at the current level of 1.65c, base, Cleveland, to be specified as material is required.

Chicago—Bar demand still is retarded by continued quiet in operations of leading consumers. Shipments are slightly more active than a week ago and while inquiry has been stimulated, orders are light. Some inquiry of a speculative nature is seen but producers are unwilling to accept long-term contracts. Prices continue 1.70c, Chicago, for soft steel bars with this figure prevailing on what second quarter contracts have been placed. Automotive requirements continue restricted and little change is noted in specifications from farm implement manufacturers.

Cold-Finished Orders in Small Lots; Price Holds

Cold Finished Prices, Page 37

Pittsburgh — The cold-finished steel bar market is practically devoid of shipments for Detroit, following the shutdown last week of three important automotive concerns. New orders have been likewise curtailed and few buyers are seeking to cover through second quarter as the price is unchanged. On such minor lots, usually for pound items to a size, 1.70c, Pittsburgh, is quoted firmly. Quantity extras for such small orders are holding.

Philadelphia—Edgecomb Steel Co., Philadelphia, bidding 2.6c, delivered, has been awarded 185,450 feet of cold-drawn screw stock, .437-inch diameter for the Frankford, Pa., arsenal, totaling approximately 75 tons of material.

Plates

Strength Given by Several Projects—Prices Not Changed for Second Quarter

PLATE PRICES, PAGE 37

Pittsburgh—Work is getting under way at the Westinghouse Electric & Mfg. Co.'s East Pittsburgh, Pa., plant on eight cylindrical intake gates for Hoover dam, the contract for which was placed a few months ago. A large tonnage of plates, about 2000 tons, as well as arc-welded cast segments, is to be used. Each cylinder weighs 240 tons. The project is believed to be one of the largest electric welding jobs ever attempted. Dravo Contracting Co. will require some 2000 tons of plates for the floating dry dock for the Navy, on which it was announced in STEEL, March 13, as the low bidder. Early closing is promised on some important gasoline barge work. Where covered by insurance, replacement buying of 10 or 12 barges wrecked in the river floods of last week in the Pittsburgh district is expected to result. Plate specifications from other sources are quiet and mill rollings are difficult to schedule. Base of 1.60c on plates is being extended into second quarter.

New York—Indications point to renewal of plate prices for second quarter, though most makers are withholding formal action. Local inquiry is in small lots.

Philadelphia—Some plate producers have indicated their intention of renewing second quarter contracts at existing prices. However, the tone of the market is generally stronger and this is expected to be reflected in higher prices on tonnages for immediate rolling, which in recent weeks have attracted in some cases material concessions from existing contract prices. The general market at present is 1.49½c to 1.69½c, Philadelphia. A leading inquiry is for approximately 2600 tons for tank work for the Philadelphia Gas Co. This may involve replacement of two gas holders or the construction of one large gas holder. Several hundred tons of plates have been released for further car repair work for the Reading Co.

Chicago—Active work in the fabricated plate market is diversified, several fair sized projects appearing for water line, oil tank and brewery equipment construction. Denver has taken bids on a temporary water line requiring 2000 tons of plates. Plates continue 1.70c, Chicago.

Cleveland—Practically all orders suspended recently due to the bank situation have been released. New buying is light, but is more diverse. Makers are reaffirming the current price of 1.60c, base, Pittsburgh, for second quarter. Some fairly good shipments have been made for manufacture of brewery tanks. While potential tonnage for this purpose is large, and many inquiries continue to be received, there is a disposition on the part of some manufacturers to wait actual demand. Many of the large breweries have kept up their equipment.

Contracts Placed

2000 tons, floating drydock, naval operating base, San Diego, Calif.; to Dravo Contracting Co., Neville Island station, Pittsburgh, $352,680; bids March 8.

400 tons, two 500-horsepower boilers for General Hospital, Los Angeles, to

Consolidated Steel Corp., Los Angeles.

250 tons, two-million gallon tank, Clewiston, Fla., to Chicago Bridge & Iron Works, Chicago.

250 tons, tunnel lining, Irvington tunnel, Hetch Hetchy project, San Francisco, to American Concrete & Steel Pipe Co., Los Angeles.

200 tons, intake line, Wilmette Ill., waterworks, to Alco Products Inc., New York.

160 tons, plates and shapes, water works, Wilmette, Ill., to Midland Structural Steel Co.

150 tons, buoys, lighthouse bureau, Staten Island, New York, including 162 special class can and nun buoys of 3/16 to ½-inch steel plate, to Tippett & Wood, Phillipsburg, N. J. and seven large buoy bodies as follows: two 9/34 bodies to R. D. Cole Mfg. Co., Newman, Ga.; three 9/32 bodies to Bartlett-Hayward Co., Baltimore, and two 8/20's to Biggs Boiler Works, Toledo, O.

145 tons, oil tank barge, United States engineers, Vicksburg, Miss., to Dravo Contracting Co., Neville Island, Pa.

125 tons, lighthouse tender DAHLIA, construction awarded to the Great Lakes Engineering Works, River Rouge, Mich.

120 tons, plates and miscellaneous steel, three boilers, Tidewater Oil Co., New York, to Babcock & Wilcox Co., New York.

100 tons or more, boiler plant equipment, navy, San Diego, Calif., to C. C. Moore & Co., San Francisco.

100 tons, 250,000-gallon tank, Wanakah, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Navy, unstated tonnage, 24 boilers for destroyers under construction; to Hedges-Walsh-Weidner Co., Chattanooga, Tenn.

Several hundred tons car repair work, Reading Co., distributed among several producers.

Unstated tonnage, 157 channel buoys, United States engineer, Huntington, Va., including 87 can-type and 70 nun, to Charleston Machine & Welding Co., Charleston, W. Va., at $10 each for can and $8 for nun.

Contracts Pending

2600 tons, gas holder work, Philadelphia Gas Co., Philadelphia; fabricators' bids being asked.

2600 tons ¼-inch for pipe for city of Denver; bids March 14.

2100 tons, Moffatt water tunnel, city and county of Denver, Colo.; bids opened; 36 to 60-inch welded steel pipe.

1000 tons, three 500-horsepower boilers for naval department, San Diego, Calif.; R. C. Meyler Corp., Los Angeles, low on specification 7171.

425 tons, 24 and 30-inch welded steel pipe, ¾-inch plate, Los Angeles; specification 3018; bids opened.

250 tons, water tower and tank for Seattle water department; bids March 15.

250 tons, two 135-ton steel oil motor tankers for Puget Sound service; date of bids not yet announced; W. C. Nickum, Seattle, naval architect.

175 tons, sheet steel piling for Nome, Alaska, harbor project by United States Engineers; bids in.

125 tons, navy, Mare Island; bids March 21.

Unstated tonnage, 100,000-gallon steel tank, Raceland, Ky.; bids March 17; also cast iron pipe and fittings for water system.

Unstated tonnage, boilers, navy, Portsmouth, N. H.; David L. MacFarlan, Boston, low, $34,982.

Railroads

Rail Inquiry Fails to Come Out —Buying for General Use Brings Some Tonnage

TRACK MATERIAL PRICES, PAGE 37

While inquiry for steel rails continues to hold back, though several important roads are believed to be on the verge of presenting their needs, buying of miscellaneous character, in small lots is being done. Reading Co. has closed for several hundred tons of steel for car repair work, about 500 tons going to one producer. Boston & Albany has placed 625 tons of tie plates with Jones & Laughlin Steel Corp., Pittsburgh. Norfolk & Western will close March 29 on 100 wrought steel wheels in addition to a similar purchase earlier in the month. Panama Canal will close bids on 100 cast iron wheels and also for track and switchstand for a 35-ton locomotive crane.

The Pennsylvania closes March 22 for second quarter requirements of steel wheels, axles, angle bars, tie plates, boiler tubes, steel pipe, spikes, bolts and nuts. Norfolk & Western has opened bids on 2500 tons of plates, shapes and bars and will take figures March 22 on nails and March 23 on pipe.

Track fastenings for maintenance of way work continue to be ordered in fair volume and some small orders for shop repair work on cars are being received. Prices on railway material have undergone no change.

Brooklyn-Manhattan Transit is inquiring for a six-car integrated unit of aluminum, at an estimated saving in weight of 40 per cent. Central Supply Co., Philadelphia, has taken about 350 tons of steel for repairs for cars.

Locomotives Pending

Navy, diesel-electric switching locomotives, Lualualei and West Lock, Honolulu; bids April 4, bureau of supplies and accounts.

Bold, Nut Demand Uneven; Some Automotive Releases

Bolt, Nut, Rivet Prices, Page 37

Second quarter books for bolts and nuts have been opened at unchanged prices, 75 off list. Cleveland makers have been asked by automotive users to give protection at this price through October. Some Chicago sellers have taken double the volume this month of the corresponding period in February. Farm implement makers have increased their orders sharply. Railroads and jobbers are buying lightly, though the latter are replenishing stocks somewhat. At Pittsburgh the situation is slower and little inquiry has been received. Orders recently suspended by Chrysler have been reinstated and some releases by Chevrolet are expected shortly. Some Pittsburgh makers have had suspensions of shipments to Detroit. Large rivets are quoted nominally at 2.25c, Pittsburgh.

Several hundred tons of bolts and nuts have been awarded by the navy department for various yards, most to the Erie Bolt & Nut Co., Erie, Pa., and the remainder to Oliver Iron & Steel Corp., Pittsburgh, and Ferry Cap & Set Screw Co., Cleveland.

Buffalo Bolt Co., Buffalo, has booked 65 tons of bolts and washers for a bulkhead for the lighthouse service at Buffalo. Fifty tons of bolts, spikes and washers will be placed soon for a project of the Albany, N. Y., port commission at Rensselaer, N. Y.

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(*Concluded from Page* 19)

of $1,962,308. Inventories during the year were reduced more than $1,500,000.

□ □ □

National Enameling & Stamping Co., Milwaukee, reports net loss of $439,321 in 1932, after charges, compared with loss of $764,196 in 1931.

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Eastern Rolling Mill Co., Baltimore, encountered net loss of $487,603, after charges, in 1932, compared with net loss of $514,888 in 1931.

□ □ □

Wellman Engineering Co., Cleveland, reports net loss of $226,342 for 1932. Current assets last Dec. 31 totaled $668,775, and current liabilities $328,138. Profit and loss surplus on Dec. 31 was $380,215.

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Steel Co. of Canada Ltd., Hamilton, Ont., reports net operating profit, after charges, in 1932 of $1,435,873, which after preferred and common dividends resulted in a deficit of $1,042,315.

Strip

Second Quarter Books Open at Old Prices—Long-Time Needs Seeking Six-Month Protection

STRIP PRICES, PAGE 37

Pittsburgh—Unchanged hot and cold-rolled strip prices were made the middle of last week when second quarter books were opened. Little interest is being shown. Thus, hot-rolled strip is being quoted currently and through June at 1.45c base, Pittsburgh. Cold-rolled strip is being reaffirmed for the average-size order at 1.90c, Pittsburgh. Specifications declined last week because of curtailment in buying by Ford and Chevrolet but some fair releases continue on Chrysler strip tonnage.

New York—Despite lack of new buying prices are firm at existing levels.

Philadelphia—Hot strip is firm at 1.45c, Pittsburgh, with cold-rolled showing better strength at 1.90c to 2.00c, Pittsburgh. Some sellers have taken a position of 2.00c on cold strip for second quarter. Specification for cold strip are somewhat improved, possibly reflecting a running out of protections at lower prices.

Cleveland—Releases from the automotive industry are a little more liberal, enabling some mills to improve operating schedules. A few sales have been made to agricultural implement manufacturers. Makers are figuring on hot-rolled bands for barrel hoops, some business having been booked for delivery to the Milwaukee district. Inquiries from miscellaneous sources have increased, but tonnage for early delivery has not stepped up materially. Hot-rolled strip has been reaffirmed at 1.45c, base, Pittsburgh, and cold-rolled at a minimum of 1.80c, base, Cleveland, for second quarter.

Chicago—Strip was slightly more active during the past week, but demand still is retarded by poor automotive operations. Consumers are seeking long-term price protection in some instances, with producers generally uninterested in contracting beyond second quarter. Prices for that period are unchanged at 1.55c, Chicago, for hot strip, with cold-rolled strip usually 1.90c to 2.00c, Pittsburgh-Cleveland.

Steelworks Operations Rebound to 15 Per Cent

Pittsburgh—Steel operations here last week averaged 13.5 per cent, higher by a point or two than was anticipated ten days ago. For this week, the rate will be approximately 15 per cent. An independent mill may reopen after having closed its two active open hearths early last week. Operating rates of a leading mill here are close to 15, while another large interest is operating into this week unchanged at 14. Eight of 53 steelworks blast furnaces continue in blast.

Youngstown, O.—Steel operations here last week sagged two points to 15 per cent, and were expected to drop to 13 per cent this week. The Carnegie Steel Co. was scheduled to shut down its Ohio Works plant March 17.

Philadelphia — Better releases against contracts temporarily held up by the bank holiday are principally responsible for a slight gain in steelmaking operations now 11 to 12 per cent, compared with 10 a week ago.

Buffalo — Steelworks operations probably will rise about 5 points this week. Last week's production equaled 11 per cent, lowest reached in some time with only four open-hearths making steel. This week six furnaces, possibly more, are likely to be in production. A continuing expansion is likely as opening of navigation approaches.

Cleveland—Steel ingot production here for the week ended March 18 averaged approximately 19 per cent, compared with the week preceding. Corrigan, McKinney Steel Co. and American Steel & Wire Co. each continued with four open hearths active. Otis Steel Co. lighted four March 17, and with these in the rate this week will be lifted to 29 per cent. Sheet and strip mill operations also will be resumed this week.

Chicago—While ingot production was unchanged at 12 per cent the past week, some slight improvement is in early prospect. Blast furnace operations continue at six active of 36 steelworks furnaces. Changes in finishing mill operations are slight.

St. Louis—With the local steelworks lighting another open-hearth furnace, the steel rate for this district has advanced to 18 per cent.

Birmingham, Ala—Steelworks continue to operate at 15 per cent, with no immediate change indicated.

Tin Mill Rate Returns to 40-50; Specifications In

Tin Plate Prices, Page 37

Pittsburgh—Tin plate mills in this district showed an advance last week of five points, to average 40 to 45 per cent. A leading maker's rate is unchanged from two weeks ago, but two independents are operating well over 50 per cent. March 15 specifications, on which canmakers asked delivery in May, were satisfactory as of tonnage but probably not as large as some mills might have expected. Coke base tin plate is $4.25 per box and No. 28 gage tin mill black sheets 2.30c, Pittsburgh. Long ternes are named at a minimum of 2.75c, Pittsburgh. Several inquiries for tin plate for bottle caps are expected.

Operating Rate of the Steel Industry, by Weeks

All figures except the monthly open-hearth and bessemer ingot totals of American Iron and Steel institute are percentages. Estimates are based upon weekly reports from the Pittsburgh, Chicago, Youngstown, eastern Pennsylvania, Cleveland, Birmingham, Ala., and Buffalo districts, which are weighted. Weeks end Saturday.

1932	1st Week	2nd Week	3rd Week	4th Week	5th Week	Steel's Average	Institute's Monthly Total tons	Institute's Monthly Average
Jan.	22	25	26	27	28.5	25.7	1,459,450	25.9
Feb.	28.5	27	25	25	....	26.4	1,457,710	26.9
March	25	25.5	24.5	23	....	24.5	1,409,054	24.1
April	23	22	22	23	24	22.8	1,238,250	22.0
May	24	24	25.5	23	....	24.1	1,106,030	19.7
June	21	17	17	17	....	18.0	897,275	15.9
July	14.5	12	15.5	16.5	16.5	15.0	792,533	14.6
Aug.	14.5	14.5	15.5	14.5	....	14.7	832,402	14.2
Sept.	13.5	15.5	15	17	....	15.3	975,061	17.3
Oct.	18	19	19.5	19.5	19.5	19.1	1,068,550	19.0
Nov.	21	21	19	17.5	....	19.6	1,014,794	18.0
Dec.	16	15	14	12	13	14.0	844,618	15.0
1933								
Jan.	15.5	17	18	19	....	17.4	1,006,297	17.7
Feb.	19	19	19	17	....	18.5	1,065,080	20.39
March	15	13.5	15..	....	....	....	.....	....

Structural Shapes

Awards Are Lighter, but Large Tonnages Are Pending on Which Action Is Anticipated Shortly — 16,000 Tons Up for Hartford Bridge —Plain Material Reaffirmed

STRUCTURAL SHAPE PRICES, PAGE 37

San Francisco—As reported briefly in STEEL, March 13, the Columbia Steel Co., subsidiary of the United States Steel Corp., was low on the bulk of steel requirements for the San Francisco-Oakland bridge. On two units, contracts No. 6 for the West bay superstructure, involving 62,305 tons of shapes, 750 tons of cast steel, 605 tons of eye-bars and 1100 tons of concrete bars, and contract No. 6-A, cable and attachments, calling for 18,700 tons of steel cable, 830 tons of other cable and 75 tons of high tensile bolts, the Columbia company was low with a combined bid of $13,732,471. This company also was low on contract No. 7, East bay superstructure at $8,798,096. This unit requires 54,125 tons of shapes and 1058 tons of concrete bars. Bridge Builders, Inc., submitted the low bid on two units, contracts No. 4 and No. 4-A for the East bay substructure, on a combined bid of $4,495,854, requiring 1140 tons of reinforcing steel and 248 tons of structural shapes.

Philadelphia—Few large projects are expected to develop in the near future but a steadily increasing volume of small construction is anticipated by leading sellers. Bills are pending in the state legislature requiring that all structural steel and ornamental iron for public buildings be placed direct and not through general contractors. Passage, it is believed, could eliminate certain evil practices in the purchasing of steel.

Boston—The general outlook for structural inquiry has improved. Prices are steady.

New York—Bids are in on the Hartford, Conn., bridge, taking about 16,000 tons, though the project is likely to be delayed. Earlier action than was expected on 10,500 tons for the federal courthouse superstructure here is probable. Low on the inspection of this steel when placed is George A. York, Floral Park Long Island, N. Y., at 4.95c a ton. New inquiries are light. Plain material is steady at 1.60c, Pittsburgh.

Pittsburgh—A Pennsylvania state letting March 31, has three bridges listed requiring a total of 607 tons of shapes. The Montour railroad, a subsidiary of the Pittsburgh Coal Co., Pittsburgh, has placed 870 tons for a viaduct at Negley, O., as part of its new 13-mile railroad link. Plain material is steady and will continue at 1.60c, Pittsburgh, for second quarter.

Cleveland—Demand continues restricted to small lots, but on a few of these action is quicker. Some buying for railroad bridge repairs is noted. The price of plain material is being reaffirmed for second quarter.

Chicago—Few large structural projects are pending or in early prospect in this market and recent awards of smaller lots have been few. For locks at Fountain City, Wis., 600 tons have been placed, with 400 tons of castings to be purchased. Plain shapes are nominally 1.70c, Chicago.

Contracts Placed

1050 tons, bridges, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

870 tons, viaduct, Negley, O., for Montour railroad, subsidiary of Pittsburgh Coal Co., Pittsburgh, to McClintic-Marshall Corp., Bethlehem, Pa.

710 tons, buildings, state hospital, Rochester, N. Y., to F. L. Heughes Co., Rochester, N. Y.; W. B. Wark Inc., general contractor.

600 tons, locks, Fountain City, Wis., to Lakeside Bridge & Steel Co., Milwaukee.

530 tons, San Diego river bridge, California, to Consolidated Steel Corp., San Francisco.

330 tons, Phelps vocational school, Washington, to Dietrich Bros., Baltimore; Catalano Construction Co., Baltimore, contractor.

280 tons, building, National Oil Products Co., Harrison, N. J., to Harris Structural Steel Co., New York.

Shape Awards Compared

	Tons
Week ended March 18	6,135
Week ended March 11	16,055
Week ended, March 4	9,805
This week in 1932	20,461
Average weekly, 1932	14,285
Average weekly, 1933	9,487
Average weekly, Feb.	12,320
Total to date, 1932	173,707
Total to date, 1933	113,852

280 tons, building for National Oil Products Co., Harrison, N. J., to National Structural Steel Co., New York.

205 tons, plant addition, Collins & Aikman, plush manufacturers, Philadelphia, to Belmont Iron Works, Philadelphia.

155 tons, bridge, Santa Rosa sound near Camp Walton, Fla., to Nashville Bridge Co., Nashville, Tenn.

150 tons, state bridge, Stoner Creek, Bourbon county, Kentucky, to American Bridge Co., Pittsburgh; Clark, Stewart & Wood, Lexington, Ky., general contractors.

125 tons, state highway bridge, Norfolk-Stanton counties, Nebraska, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

115 tons, state highway bridge, Monroe county, Illinois, to St. Louis Structural Steel Co., St. Louis.

115 tons, steel castings, lock and dam No. 5, Green river, Kentucky, to American Steel Foundries Co., Chicago; Frazier-Davis Construction Co., St. Louis, general contractor.

100 tons, approximate, bridge, Shenandoah river, Shenandoah county, Virginia, to Roanoke Iron & Bridge Co., Roanoke, Va.

100 tons, school, Mahoney, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

100 tons, state highway bridge, McCook-Indianola counties, Nebraska, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, state highway bridge, Falls City North, Neb., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, state bridge, Revere beach parkway, Revere, Mass., to Boston Bridge Works, Cambridge, Mass.; C. & R. Construction Co., Boston, general contractor.

100 tons, state highway bridge, Santa Fe, N. Mex., to Kansas City Structural Steel Co., Kansas City, Mo.

Contracts Pending

62,960 tons, and 750 tons of cast steel, 300 tons of rivets and 605 tons of eye-bars, contract No. 7, West bay superstructure, San Francisco-Oakland bridge; Columbia Steel Co., San Francisco, low.

54,125 tons, contract No. 7, East bay superstructure, San Francisco-Oakland bridge; Columbia Steel Co., San Francisco, low.

15,750 tons, superstructure suspension bridge, Hartford, Conn.; John A. Roebling's Sons Co., Trenton, N. J., low, $2,056,400; bids March 13. Project likely to be delayed awaiting Connecticut legislative action. Other requirements include 650 tons of wire strand cable, 33 tons of wrapping wire, 8000 feet of 1⅞-inch suspender rope, and 6600 feet three-fourth in hand rope, 241 tons of steel castings, 29 tons of malleable iron castings, 335 tons of cast steel splices.

8000 tons, federal building and postoffice, Los Angeles; bids soon.

3500 tons, viaduct, route 21, section 1, from pier 16 to Poinier street across yards of Pennsylvania railroad, Newark, N. J.; George M. Brewster & Son Inc., low; bids March 13.

1500 tons, contract No. 5, Yerba Buena island crossing, San Francisco-Oakland bridge; bids postponed from March 7 to March 28.

1363 tons, contract No. 3, San Francisco anchorage, San Francisco-Oakland bridge; bids postponed from March 8 to March 29.

1000 tons, highway toll bridge between

Upper Black Eddy, Pa., and Milford, N. J.

800 tons, bridge repairs, Louisville & Nashville railroad.

600 tons, tonnage tentative, 80 to 200 towers with base insulators, department of commerce; bids in March 17, proposal 25130.

535 tons, North Main street viaduct, Jacksonville, Fla.

300 tons, postoffice, San Pedro, Calif.; bids soon.

300 tons, sheet steel piling, pier and quays, Pearl Harbor, T. H.; bids May 3.

200 tons, postoffice, Columbus, Ga.; James Devault, Canton, O., general contractor.

200 tons, postoffice, Cambridge, Mass.

150 tons, 3-story extension to storehouse, Pearl Harbor, T. H., specifications 7085; bids April 5.

120 tons, bridge for Santa Fe railroad over Orange avenue, Los Angeles; bids soon.

100 tons, shapes and concrete bars, postoffice, Waynesboro, Pa.; Jerome Construction Co., New York, low.

101 tons, bridges, Clark and Pearl river counties, Mississippi; bids March 21.

Unstated tonnage, mechanical flow control equipment, La Fruta dam, near Corpus Christi, Tex.; Petroleum Iron & Steel Co., Houston, low, $54,252.

Coke

More Forward Interest Noted; Pittsburgh Prices Easier

COKE PRICES, PAGE 38

Only Chicago and St. Louis report a rebound in shipments of coke following the holdups occasioned by the bank holidays, but a little more forward interest is manifested. Pittsburgh notes a decided falling off in domestic orders, with no compensating improvement in industrial demand. By-product interests at St. Louis have received a fair number of new carload orders. New York looks for better specifications.

An easier market is noted at Pittsburgh where furnace coke is $1.75, ovens, and foundry, $2.25 to $4. Because foundry contracts at Chicago do not expire until July 1, there has been little effort for price protection. St. Louis ovens are not anxious to sell heavily into the second quarter at current levels. Birmingham and Cincinnati quotations are unchanged.

Semifinished Steel Quiet

Semifinished Prices, Page 38

The price of $26, Pittsburgh, for sheet bars, billets and slabs is not receiving much of a test, and may be extended for second quarter. Wire rods also are quiet, at $35, Pittsburgh. Demand for forging billets is slower.

Concrete Bars

Public Work Still in Abeyance, and Awards Are Smaller—Cumulative Tonnage Placed So Far This Year Is Approximately 75 Per Cent of That in 1932

REINFORCING BAR PRICES, PAGE 37

New York—Concrete bar lettings include 300 tons for two New York city incinerators, while close to 2500 tons are active in this district. Prices are firmer at 1.50c to 1.60c, Pittsburgh and Buffalo, with some mills refusing to cover at these levels on old jobs after March 31.

Philadelphia—Placing of 800 tons for a sewage disposal plant at Lancaster, Pa., features the local concrete bar market. New inquiries are light and preclude a test of the new price of 1.55c, Pittsburgh, adopted by some sellers.

Pittsburgh—A few small orders for new billet reinforcing steel have come into this district and though the tonnage has been slight, it represents an improvement over two weeks ago. New billet steel is firmly quoted at 1.40c, Pittsburgh, base for mill lengths, with $3 up for cut lengths. Rail steel is nominal at 1.50c, Pittsburgh.

Cleveland—The state has canceled recent bids on road work, and few project, public or private, are active. A sanitation project in Berea, O., requiring 135 tons, is the largest pending.

Chicago—Recent award of several large reinforcing bar tonnages leaves the market almost devoid of anything except small lots. Inquiries for the latter continue few. Business is providing the new price schedule with little test.

Contracts Placed

800 tons, sewage disposal plant, Lancaster, Pa., to Edward T. Edwards, Columbia, Pa.; through Thomas Burke, Philadelphia, general contractor.

389 tons, Boulder canyon project, Denver, to Pacific Coast Steel Corp., San Francisco.

300 tons, two incinerators, New York, to Joseph T. Ryerson & Son Inc., New York.

250 tons, infantry battalion barracks, Plattsburg, N. Y., to Joseph T. Ryerson & Son Inc., New York, through J. A. Moraw & Owens Co., Chicago.

225 tons, section B, Humboldt sewer, St. Louis, to Laclede Steel Co., St. Louis.

170 tons, barracks, West Point, N. Y., to Truscon Steel Co., Youngstown, O.; through D. A. Sullivan & Sons Inc., Northampton, Mass.

170 tons, highway, New Brunswick, N. J., to Truscon Steel Co., Youngstown, O.; through Burket Construction Co.

104 tons, United States engineer, Milwaukee, to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, postoffice, Beverly Hills, Calif., to Pacific Coast Steel Corp., San Francisco; Sarver & Zoss, Los Angeles, general contractor.

Concrete Awards Compared

	Tons
	Tons
Week ended March 18	2,508
Week ended March 11	5,250
Week ended March 4	4,475
This week, 1932	3,419
Average weekly, 1932	3,920
Average weekly, 1933	3,651
Average weekly, Feb.	3,539
Total to date, 1932	60,740
Total to date, 1933	43,812

Contracts Pending

5000 tons, bridge, First and Fifth streets, viaducts over James river, Richmond, Va.; bids April 4 and 5.

2750 tons, substructure, bridge, Hartford, Conn.; Poirier McLane Corp., New York low, $2,364,825.75. Project likely to be delayed subject to action by Connecticut legislature which adjourns in June. Work also includes 6650 tons, 20 inch o.d. one-half-inch wall steel pipe and 565 tons malleable iron and steel handrail.

2220 tons, contract No. 5, Yerba Buena island crossing, San Francisco-Oakland bridge; bids postponed from March 7 to March 28.

1400 tons, contract No. 3, San Francisco anchorage, San Francisco-Oakland bridge; bids postponed from March 8 to March 29.

1140 tons, contracts No. 4 and No. 4-A, East Bay substructure, San Francisco-Oakland bridge; Bridge Builders Inc., San Francisco, low.

1000 tons, pier and quays, Pearl Harbor, T. H., for navy department, specification 7224; bids May 3.

650 tons, viaduct, route 21, section 1, from pier 16 to Poinier street across yards and tracks of Pennsylvania railroad, Newark, N. J.; George M. Brewster & Son Inc., low; bids March 13.

638 tons, state roadwork in Lonoka and Lawrence counties, Arkansas; bids March 14.

165 tons, highway, route 29, section 3A, Empire street to Hillside place, Essex and Union counties, New Jersey; S. J. Groves & Sons Co., low.

107 tons, Second street bridge, Los Angeles; bids March 20.

100 tons, mausoleum, Taft, Calif.; bids March 17.

Pipe

More Than 10,000 Tons Placed By Four Cities; Chicago Taking Bids on 10,260 Tons

PIPE PRICES, PAGE 37

Chicago—Bids close March 23 on 10,260 tons of cast iron pipe and fittings for the new Chicago pumping station. Among other inquiries is one for 1600 tons of pipe for Springfield, Ill. Orders recently have been light but the tone of the market has improved. Only about 300 tons of cast iron pipe will be required for the Wilmette, Ill., waterworks, since steel pipe will be used for the intake.

Boston—Bids are in on 2200 tons of cast pipe and fittings for Boston and the state of Massachusetts. Most municipal requirements are developing slowly. Crosby Steam Gage & Valve Co., Boston, is low bidder on low-pressure valves for the navy, delivery at several points, at $3558.60.

New York—Bids close March 28 on 2675 tons of cast pipe for Montrose, N. Y. Current buying is light. Bids are in on 250 tons for New Rochelle, N. Y. and 1000 feet, 12-inch for Fort Jay, N. Y. Prices average close to $30, foundry.

Philadelphia—Consolidated Gas & Electric Co., Baltimore, is expected to enter the market shortly for 10 miles of 6-inch steel pipe, approximately 520 tons.

Pittsburgh—Demand for oil country tubular products is holding up fairly well, somewhat better than that for standard pipe. Of more than 600 miles of line pipe in various projects figured by district mills about the first of the year, little has actually developed into orders. Financing seems to be the stumbling block in other instances. Mechanical tubing has been moving slower to the Detroit district.

Cincinnati—United States Pipe & Foundry Co., which has a foundry at Addyston, near here, was awarded the contract to supply 106,900 feet of cast pipe, 4 to 16-inch, for the Cincinnati waterworks. The bid was $96,309. The Donald H. Walter Co., New York, was awarded 175 tons of fittings and special castings, at $10,923. Total tonnage is estimated at around 2500 tons.

Birmingham, Ala.—Backlogs are building up at cast iron pipe foundries but specifications are slow.

Cast Pipe Placed

3370 tons, 8-inch class 150, Los Angeles; allocated 1824 tons to United States Pipe & Foundry Co., Burlington, N. J.; 912 tons to American Cast Iron Pipe Co., Birmingham, Ala.; 634 tons to National Cast Iron Pipe Co., Birmingham, Ala.

2420 tons, Dallas, Tex., including 2000 tons, 4 to 12-inch, to United States Pipe & Foundry Co., Burlington, N. J., and 420 tons, 16 to 24-inch to American Cast Iron Pipe Co., Birmingham, Ala.

2000 tons, 20-inch, Kansas City, Mo., divided about evenly to National Cast Iron Pipe Co., Birmingham, Ala., United States Pipe & Foundry Co., Burlington, N. J., and American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

10,260 tons, pipe and fittings, Chicago pumping station; bids March 23.

2675 tons, 6 to 16-inch, classes A and B, Montrose, N. Y.; bids March 28.

1600 tons, various sizes, Springfield, Ill.; bids March 20.

1200 tons, Boston, United States Pipe & Foundry Co., Burlington, N. J., low at $32.50, delivered, for all sizes.

Iron Pipe Pending

Unstated tonnage, 8670 feet, 10 to 30-inch copper-bearing iron culvert pipe, Sussex county, New Jersey; bids in March 21.

Wire Shipments Better; Buying Not Price Test

Wire Prices, Page 37

Chicago—Wire shipments have improved slightly but activity still reflects slow operations among important consumers and the interference with banking facilities. Inquiry is more active with producers uninterested in extending price protection beyond the second quarter. The market for that period continues $1.90 for wire nails and 2.15c for plain wire.

Philadelphia—With protections at lower prices than now prevail scheduled for conclusion by April 1, improvement in wire and nail specifications over the remainder of the month is generally anticipated by the trade.

Buffalo—Spring demand for wire fabric for road construction is developing slowly. Other grades are moving in line with restricted demand for all grade of steel, with a slightly stronger tone.

Pittsburgh—Shipments of wire products, including nails, expanded slightly last week. The light character of buying, however, does not afford a test to prices in many cases and the price is unchanged, with $1.85 generally applying on new business in carload lots on nails and 2.10c per hundred pounds for plain bright wire for manufacturing purposes.

Cleveland—Mills are covering for second quarter at present price levels, but are seeing to it that tonnage named in contracts does not exceed reasonably anticipated needs. With prices tending to strengthen, makers are cautious as to how much will be delivered on this market. Deliveries show moderate improvement after the recent interruptions due to bank holidays.

Iron Ore Prices Awaited; Stocks Are Reduced

Iron Ore Prices, Page 38

Cleveland—Lake Superior iron ore producers have not yet named prices for the season. With stocks ample enough to carry consumers well into the season, and other raw material prices and commodities advancing, action is not anticipated for some time. Stocks on lower lake docks and at furnaces March 1 were 30,152,106 tons, compared with 35,726,443 tons March 1 last year, according to current report from the Lake Superior Iron Ore association. The annual average for eight years prior to 1931, as of March 1, was 28,400,000 tons. Consumption in February, 634,443 tons, was down 26,673 tons from January.

Refractories Are Inactive

Refractories Prices, Page 38

Pittsburgh—There is no sign by steel mills here of increasing inventories of refractory brick. Small lots of brick for immediate delivery are moving. First quality fire clay brick remains quoted unchanged at $35 per thousand, f.o.b. Pennsylvania and Ohio works. Second quality fire clay ranges from $25 to $30 per thousand. Chrome brick is quoted $42.50 per net ton, and burned magnesite $61.50.

Ferroalloys Steady

Ferroalloy Prices, Page 38

Ferroalloy specifications are increasing somewhat from the low point touched during the bank holiday. Sellers are confident that a further gain is in prospect. Ferromanganese is unchanged at $61, duty paid, on spot, and $68 on contracts. Domestic spiegeleisen, 19 to 20 per cent, is steady at $24, furnace, for spot shipment.

Pig Iron

Better Inquiry But Sellers Avoid Distant Commitments—Prices Retain Firmness

PIG IRON PRICES, PAGE 38

Chicago—Pig iron orders and inquiries have increased sharply, business the past week being reported by some interests the most active in 18 months. A number of consumers who had been buying a few carloads at a time, seek protection against a possible upturn in prices with placing of larger lots. March shipments, however, will be smaller than February. Pig iron still is $15.50, furnace, for No. 2 foundry and malleable, but sellers generally are unwilling to extend contracts beyond second quarter.

Pittsburgh—Willingness of pig iron producers to accept contracts through June or July has not been caused by actual inquiries or anxiety of melters for that period. Therefore, the merchant iron market shows no mentionable change, and those small melters fortunate enough to be operating even one and two days a week are taking only spot carloads. To further accentuate competition for such mediocre business, Cleveland furnaces have been selling as small as a carload at a time in the immediate Pittsburgh switching area. The market is nominal at $15, Pittsburgh district furnace, for normally important grades, except basic.

Boston—With development of some inquiry for second quarter, sentiment has improved. A New Britain, Conn., melter is inquiring for several hundred tons. While there is talk of firmer prices, notably possibility of a $1 increase on Dutch iron at Providence, better prices have not been attained. Some India has sold at $14.50, dock. Buffalo figures back to $14, furnace, while the local foundry is averaging close to $17, furnace, on small lots.

New York—While sentiment is greatly improved, pig iron inquiry has increased slowly, a fact attributed in part to the jobbing character of most consumers. These interests must first wait for business to resume in other channels before closing. Outstanding are 300 to 500 tons of foundry for a New Britain, Conn., consumer for delivery into third quarter.

Philadelphia—In addition to two previously-noted inquiries aggregating 3000 tons, three new ones are pending, involving approximately 1000 tons, with small scattered lots comprising 1000 tons. A quickening in general business will undoubtedly see some substantial inquiries for steelmaking iron, sellers believe. Eastern Pennsylvania foundry is firmer at $12.50 to $13, furnace, and basic at $13.50, delivered.

Buffalo—Demand for pig iron has been quiet the past week but the strong feeling that prices are due for an increase is causing consumers to watch closely for such developments. Inquiry is broadening. Shipments have been small the past ten days on account of the bank holiday, but improved somewhat after its end.

Cleveland—A leading merchant furnace interest here booked 5000 tons of pig iron during the week, largest since last September. Several of the inquiries for 1000 to 2000-ton lots noted at the beginning of the week were definitely closed, and new inquiries for substantial lots appeared. No less than 10,000 tons now is pending on inquiry before furnace interests here. Makers are contracting at present prices for second quarter, but not beyond. Shipments, especially to the automotive industry are slower. Prices are firmer.

Cincinnati—Possibility of higher prices for northern iron sent consumers scurrying into the market to contract for second and third quarter needs at present quotations at $16.02, base, Cincinnati, or $13, base, Cleveland, which were reported firm. Furnace interests reported closing of orders for 800 tons, with prospects of early contracting for lots from 300 to 1200 tons. The market for southern iron was less active. Shipments were moderately improved.

St. Louis—Small lot ordering is heavier, inquiries are expanding and the undertone of the market much firmer. Some producers will not commit into the third quarter until the full aftermath of the banking holiday has been ascertained.

Birmingham, Ala.—While confidence is being restored on reopening of banks, no noticeable improvement in pig iron market is reported. Cast iron pipe production is increasing slightly.

Toronto, Ont.—Business in Canadian pig iron markets is dull. Melters are buying as demands dictate, but no inquiries are out for large tonnages or future delivery. Weekly awards now are down to around 300 tons. Prices are firm but unchanged.

Equipment

Steel Mills Resume Buying as Confidence Is Restored

Pittsburgh—Andrews Steel Co., Newport Ky., is changing its mill drives from steam to electric and last week placed an order with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for new control equipment. The order involved four air break de-ion circuit breakers for the 3000-horsepower main mill motor and 35 magnetic controllers for auxiliary motors in the plant. Some additional equipment including automatic screwdown control already has been shipped to this company.

The Rotary Electric Steel Co. (Michigan) which is locating a plant in Detroit, has been buying some equipment in this district. A large 3-electrode Heroult electric furnace will be supplied for this company's plant by American Bridge Co., Pittsburgh. The furnace is reported to have a capacity of over 60 tons. In addition, an order for two continuous heating furnaces has been placed with Swindell Dressler Corp., Pittsburgh. The same purchaser was recently inquiring for hot beds, gear sets and other auxiliary mill equipment in this district. Pittsburgh Steel Co. may purchase a small annealing furnace.

Cleveland—With the clearing of the financial situation, sentiment is much improved and inquiries for machinery and equipment are resuming, with sellers' spirits buoyed perceptibly. Lincoln Electric Co. has received an order for some 40 motors, ranging from 60 to 150 horsepower, for a steel mill here, to be used in connection with a rehabilitation program. The Lincoln company also shipped recently to the Iraq Petroleum Co. in the Near East a number of gas engine driven welding machines and practically all electrodes required for welding a 1200-mile oil pipeline.

New York—Industrial activity in machinery and equipment is light, both inquiry and sales. While the Russian buying interest has figures, and is still taking quotations on equipment in this country, nothing has been closed of iate.

Worcester, Mass.—With few exceptions New England machine building shops are operating on short schedules, little improvement in buying and inquiry being noted. This extends to plants making textile machinery, the demand for which is spotty and largely for part replacements.

Scrap

Strength Evident from Short Supply and Expected Increase in Demand—Sales Hold Back

Chicago—Scrap inquiry has increased sharply and with indications of higher prices in the near future offerings are light and a stronger situation has developed. In some grades, particularly cast, acute shortages have developed and bids above the recent market have failed to uncover tonnages. Most inquiries are from smaller consumers with limited stocks, who anticipate higher prices soon. Activity in steel grades continues quiet and shipments remain slow. Iron car wheels and malleable scrap are higher on recent sales.

Pittsburgh—Shipments were resumed early last week on orders for Pittsburgh district plants of the leading consumer here, after suspensions of about a week previous-

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	6.50 to	7.00
Boston, dealers	3.50 to	3.75
Buffalo, No. 1	7.00 to	7.25
Buffalo, No. 2	6.00 to	6.25
Chicago	5.00 to	5.50
Cleve., No. 1	7.00 to	7.50
Cleve., No. 2	6.00 to	6.50
Det., No. 1 deal.	4.50 to	5.00
Det., No. 2 deal.	3.75 to	4.25
E. Pa. del. mill		6.50
E. Pa., No. 2 del.	5.00 to	5.50
Federal, Ill.	4.75 to	5.25
Granite City, Ill.	5.00 to	5.50
N. Y., deal. R. R.		5.00
N. Y. deal. No. 2		3.50
N. Y. deal. yd.	2.50 to	3.00
Pitts. No. 1	8.50 to	9.00
St. L. No. 1 sel.	5.50 to	6.00
Valleys, No. 1	9.00 to	9.50

COMPRESSED SHEETS

Buffalo, dealers	6.00 to	6.25
Chi. (Factory)	4.00 to	4.50
Cleveland	6.50 to	7.00
Detroit, dealers	4.00 to	4.50
E. Pa. new mat.	5.00 to	6.00
Pittsburgh	8.25 to	8.75
Valleys	8.50 to	9.00

BUNDLED SHEETS

Buffalo	4.00 to	4.50
Cincinnati, del.	4.25 to	4.75
Cleveland	4.50 to	5.00
Eastern, Pa.		5.00
Pittsburgh	7.25 to	7.75
St. Louis	1.50 to	2.00

SHEET CLIPPINGS LOOSE

Chicago	2.00 to	2.50
Cincinnati	1.75 to	2.25
Detroit, dealers	1.25 to	1.75
St. Louis	1.50 to	2.00

STEEL RAILS SHORT

Birmingham	6.50 to	7.00
Boston, dealers	3.00 to	3.25
Buffalo	9.50 to	10.00
Chicago (3 ft.)	7.50 to	8.00
Chicago (2 ft.)	8.00 to	8.50
Cincinnati, del.	8.50 to	9.00
Detroit, deal.	8.00 to	8.50
Pitts. (open-hearth, 3 ft. and less)	10.00 to	10.50
St. Louis	7.00 to	7.50

STOVE PLATE

Birmingham	5.00 to	5.50
Boston, dealers	2.00 to	2.50
Buffalo	7.00 to	7.25
Chicago, net	4.50 to	5.00
Cinci., deal. net	3.50 to	4.00
Det., net deal.	2.50 to	3.00
Eastern Pa.	5.50 to	6.00
N. Y., deal. mill	2.50 to	3.00
St. Louis	5.50 to	6.00

COUPLERS, SPRINGS

Buffalo	8.50 to	9.00
Chicago	6.50 to	7.00
Eastern Pa.	8.00 to	8.50
Pittsburgh	9.75 to	10.25
St. Louis	5.25 to	6.25

ANGLE BARS—STEEL

Chicago	7.00 to	7.50
St. Louis	5.75 to	6.25

LOW PHOSPHORUS

Buffalo, billets and bloom crops	8.50 to	9.00
Cleveland bil. and bloom crops	10.00 to	11.00
Eastern Pa.		10.00
Pittsburgh billet bloom crops	10.75 to	11.25
Pitts., sheet bar crops	10.75 to	11.25

FROGS, SWITCHES

Chicago	5.00 to	5.50
St. Louis	5.00 to	5.50

SHOVELING STEEL

Chicago	5.00 to	5.50
Cleveland	5.75 to	6.00
St. Louis	4.75 to	5.25

RAILROAD WROUGHT

Birmingham	5.50 to	6.00
Boston, dealers	1.00 to	1.50
Buffalo, No. 1	4.25 to	4.75
Buffalo, No. 2	7.00 to	7.25
Chi., No. 1, net	4.50 to	5.00
Chicago, No. 2	5.00 to	5.50
Cinci., No. 2	5.25 to	5.75
Eastern Pa.	6.50 to	7.50
N. Y., No. 1, deal.	2.50 to	3.00
Pitts., No. 1	8.50 to	9.00
St. Louis, No. 1	3.50 to	4.00
St. Louis, No. 2	5.00 to	5.50

SPECIFICATION PIPE

Boston	3.00 to	4.00
Eastern Pa.	6.00 to	7.00
N. Y., deal	2.00 to	2.25
St. Louis	4.75 to	5.25

BUSHELING

Buffalo, No. 1	6.00 to	6.25
Chicago, No. 1	3.50 to	4.00
Cinci., No. 1 deal.	4.25 to	4.75
Cinci., No. 2	2.50 to	3.00
Cleve., No. 2	4.00 to	4.50
Det., No. 1 new deal.	3.50 to	4.00
St. L., No. 1	3.00 to	3.50
Val. new No. 1	8.50 to	9.00

MACHINE TURNINGS

Birmingham	2.50 to	3.00
Boston, dealers	0.75 to	1.00
Buffalo	3.75 to	4.25
Chicago	3.25 to	3.75
Cinci., deal	3.00 to	3.50
Cleveland	4.00 to	4.25
Detroit	2.25 to	2.75
Eastern Pa.	3.50 to	4.00
N. Y., deal.	1.35 to	1.50
Pittsburgh	6.25 to	6.75
St. Louis	1.50 to	2.00
Valleys	6.75 to	7.25

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	0.75 to	0.90
Buffalo	3.00 to	3.50
Cinci., deal	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit, deal.	2.75 to	3.25
Eastern Pa.	3.50 to	3.75
N. Y., deal.	1.35 to	1.50
Pittsburgh	5.50 to	6.00

CAST IRON BORINGS

Birming., chem.	8.50 to	9.50
Birming., plain	2.50 to	3.00
Boston, chem.	5.50 to	6.00
Boston, dealers	1.00 to	1.25
Buffalo	3.50 to	4.00
Chicago	3.25 to	3.75
Cinci., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit, deal.	2.75 to	3.25
Eastern Pa.	3.50 to	3.75
E. Pa., chem.	8.00 to	10.00
N. Y., deal.	1.00 to	1.50
Pittsburgh	5.50 to	6.00
St. Louis	2.00 to	2.50

PIPE AND FLUES

Cinci., deal.	3.25 to	3.50

RAILROAD GRATE BARS

Buffalo	4.00 to	4.50
Chicago, net	5.00 to	5.50
Cincinnati	4.25 to	4.75
Eastern Pa.	5.50 to	6.00
N. Y., deal.	3.50 to	4.00
St. Louis	4.50 to	5.00

FORGE FLASHINGS

Boston, dealers	2.00 to	2.50
Buffalo	5.50 to	6.00
Cleve. ov. 10 in.	6.00 to	6.50
Detroit	2.75 to	3.25

FORGE SCRAP

Boston, dealers	1.75 to	2.00
Chicago	6.50 to	7.00
Eastern Pa., del.	5.00 to	5.50

ARCH BARS, TRANSOMS

Chicago, net	5.00 to	5.50
St. Louis	3.50 to	4.00

AXLE TURNINGS

Boston, deal.	2.50 to	3.00
Buffalo	6.00 to	6.25
Chi., elec. fce.	4.50 to	5.00
Cleveland	5.50 to	6.00
Eastern Pa., del.	6.00 to	7.00
Pittsburgh, O. H.	7.00 to	7.50
St. Louis	3.00 to	3.50

STEEL CAR AXLES

Birmingham	9.00 to	10.00
Boston, ship. pt.	5.50 to	6.50
Buffalo	10.00 to	10.50
Chicago, net	8.50 to	9.00
Eastern Pa.		14.50
St. Louis	8.75 to	9.25

SHAFTING

Boston, ship pt.	6.50 to	7.00
Eastern Pa.	11.00 to	12.00
N. Y., deal.	5.50 to	6.00
St. Louis	7.50 to	8.00

CAR WHEELS

Birming., iron	6.50 to	7.00
Boston, iron deal.	3.00 to	3.25
Buffalo, iron	7.00 to	8.00
Buffalo, steel	8.50 to	9.00
Chicago, iron	8.25 to	8.75
Chi., rolled steel	7.00 to	7.50
Cincinnati iron	6.25 to	6.75
E. Pa. iron		8.50
E. Pa. steel	8.00 to	8.50
Pitts., iron	7.75 to	8.25
Pitts., steel	9.25 to	9.75
St. Louis, iron	4.75 to	5.25
St. Louis, steel	6.00 to	6.50

NO. 1 CAST SCRAP

Birmingham	6.50 to	7.50
Boston, textile	6.50 to	6.75
Boston, No. 2	2.00 to	2.25
Buffalo (Mach.)	9.50 to	10.00
Buffalo, cupola	9.00 to	9.25
Chi., mach. net	5.75 to	6.25
Chi., railroad net	5.50 to	6.00
Chicago, agri., net	5.00 to	5.50
Cinci., mach. cup	6.50 to	7.00
Cleve. cupola	7.00 to	8.00
Det., net deal.	6.50 to	7.00
E. Pa. cupola	9.00 to	9.50
N. Y., cup. deal.	4.50 to	5.00
N. Y., del. local foundries	7.00 to	7.50
Pitts., cupola	9.00 to	9.50
San Fran., del.	13.50 to	14.00
Seattle	4.50 to	6.50
St. L. No. 1 mach.	6.00 to	6.50
St. L. No. 1	5.50 to	6.00

HEAVY CAST

Boston, del.	3.25 to	3.50
Bost., mach. cast	7.00 to	7.50
Buffalo, break	6.50 to	7.00
Cleve., break	5.50 to	6.00
Detroit, auto net deal.	7.00 to	7.50
Det. break., deal.	4.00 to	4.50
Eastern Pa.	8.00 to	8.50
N. Y. No. 1, deal.	4.50 to	5.00
N. Y. break, deal.	4.00 to	4.50
Pittsburgh	8.00 to	8.50

MALLEABLE

Boston, consum.	6.75 to	7.25
Buffalo	8.00 to	8.50
Chicago, agri.	5.00 to	5.50
Chicago, R. R.	6.50 to	7.00
Cinci., agri. del.	6.00 to	6.50
Cinci., R. R., del.	6.50 to	7.00
Cleveland, rail	7.50 to	8.00
Det. auto deal.	5.00 to	5.50
St. Louis	7.00 to	7.50

RAILS FOR ROLLING

5 feet and over

Birmingham	7.50 to	8.00
Boston, deal	5.00 to	5.50
Buffalo	7.00 to	7.50
Chicago	7.50 to	8.00
Eastern Pa.		9.50
New York dealer	3.75 to	4.25
St. Louis	7.00 to	7.50

LOCOMOTIVE TIRES

Chicago, cut	7.00 to	7.50
St. L., No. 1	5.00 to	5.50

LOW PHOS. PUNCHINGS

Buffalo	9.00 to	9.50
Chicago	7.00 to	7.50
Eastern Pa.	8.00 to	8.50
Pittsburgh	10.00 to	10.50

ly. This follows closely upon the $8.75 purchase of No. 1 steel by the same interest and the latter represents the last important mill purchase in this district. An independent mill in this district, which purchased No. 1 steel several weeks ago at $8.25, has been attempting to duplicate, but unsuccessfully. Hydraulic compressed sheets are quiet and no purchase of this grade followed the No. 1 steel buy by the Donora, Pa., interest as has been usual in times past.

Philadelphia—Scrap prices are buoyant, but in the absence of buying most grades are unchanged, and in some grades are nominal. While no boats are being loaded here at this time, buying for Japan continues. Buying for Italy and Poland has ceased.

Boston—Rails for rerolling are slightly more active with $5.75 to $6, delivered, paid by the local rerolling mill. Activity in No. 1 steel is largely buying for a 7000-ton cargo for Japan with some small shipments to New England consumers.

Heavy melting steel is stronger, an advance of 50 cents being offered by some dealers, at $3.50 to $3.75.

New York—Buying of No. 1 and 2 grades of scrap steel for export continues at unchanged prices, but it is being accumulated at primary sources more slowly. It is estimated that close to 20,000 tons of scrap booked for export has yet to be shipped, while nearly twice that volume has already moved to Japan, Poland and Italy in recent months.

Buffalo—Scrap continues firmly held. Dealers are unwilling to sell at recently quoted ranges. Arrivals of scrap have been small for two months.

Youngstown, O.—Advance of 50 cents per ton in quotations on heavy melting steel and other grades of steel scrap have been made. The market is definitely stronger.

Cleveland—Release by an important iron and steel scrap consumer here of something like 1000 tons of borings and turnings for blast furnace use has injected a bit of cheerfulness to the former drab trade situation. The tonnage was distributed among several dealers. The price averages around $5.25.

Detroit—Practically no scrap has come out the past week, due to the almost complete cessation of automobile production, and demand has been correspondingly light, but the market continues strong.

Cincinnati—Important consumers came back into the market during the past week for iron and steel scrap, found other buyers but few willing to sell at present quotations. Heavy melting steel advanced 25 cents to $5.25 to $5.75. No. 1 busheling, grate bars, and sheet clippings also advanced 25 cents.

St. Louis—While purchasing of iron and steel scrap is still in small volume, there has been a noticeable gain in demand for malleable and cast grades, and slight improvement in inquiry for steel.

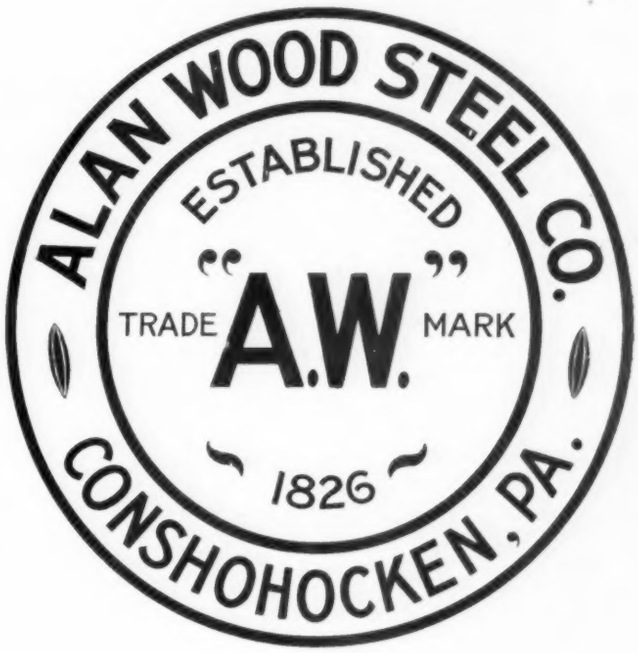
Birmingham, Ala.—Dealers with contracts are asking shipping orders from melters to complete transactions. Slight adjustments in prices show no definite trend.

Toronto, Ont.—Trading in iron and steel scrap is dull. While a few special grades, such as machinery cast, stove plate and malleable, are moving sparingly other lines are at a standstill. No. 1 machinery cast has a steady call with dealers offering $9 to $9.50 per net ton delivered, Toronto, but offerings are scarce and dealers are importing to fill orders.

Carbon and Alloy Steels
Blue Annealed Sheets,
Sheared Plates: also Billets.

Rolled Steel Floor Plates
Diamond, Diamondette and Ribbed Patterns

Swede Pig Iron
Rainey-Wood Coke



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ALAN WOOD STEEL CO.
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Warehouse

Warehouse Selling Better—Drop Cold-Rolled Extra

Detroit—The 50 cent extra for cold-rolled flats and squares out of warehouse has been eliminated and the market on all grades of cold-rolled bar products is now 3.15c, base. No. 24 galvanized sheets are now quoted 3.50c and No. 24 black sheets 3.30c. Warehouse demand the past few days has been negligible owing to the tieup of automobile production, but it is believed that the trend be upward shortly.

Philadelphia—Jobbers report little actual improvement in buying. Trade sentiment is the best in many months. Prices are unchanged.

New York—Orders and inquiry with some New York jobbers have shown a spirited increase during the last week Not only have small orders gained, but several have closed some substantial business. Jobbers are considering an early revision of prices on sheets in line with recent mill adjustments.

Baltimore — Warehouse demand here is more active. Most jobbers look for further improvement over the next few weeks. Prices are steady.

Pittsburgh—Cold-drawn flats and squares remain quoted 3.45c, Pittsburgh warehouse. The extra of 50 cents up for flats and squares over the price of rounds and hexagons has generally been waived at Chicago, Cleveland and Philadelphia, but in other centers including Pittsburgh and Buffalo, this regular differential is holding. There has been a big increase in warehouse inquiries in this district the past week. Most ask prices on varied small lots of steel products mainly for rehabilitation work by breweries and glass plants in this and West Virginia districts.

Cleveland—Tonnage has improved slightly and the market gives evidence of more confidence, which with further adjustments in the banking situation here and more liberal credit, is expected to materialize in much better demand. The 50-cent extra on cold-finished flats and squares has been dropped, bringing them on the same basis as rounds and hexagons. Prices are steady.

Cincinnati—Jobbers here noted a quick return in buying as banking restrictions were lifted, chiefly from industrial sources.

Chicago—Sales expanded moderately during the past week, following an almost complete disappearance of orders during the bank moratorium. Seasonal influences are expected to stimulate demand further in the near future. Prices are unchanged.

St. Louis—Emerging from disabilities incident to the bank holidays, business of warehousemen has developed moderate betterment. Items for highway construction and other outdoor engineering projects are showing more life, and there are signs of seasonal interest in other building materials, including wire nails.

Warehouse Quotations at Leading Centers, in Cents Per Pound

(All Philadelphia prices subject to quantity differentials except reinforcing and Swedish bars)

STEEL BARS □

Baltimore*	2.35c
Boston††	2.90c
Buffalo	2.95c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.40c
Los Ang.	3.30c
New Orleans	2.50c
New York‡(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.60c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS □

Baltimore	2.35c
Boston††	3.10c
Buffalo	3.15c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia	2.45c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS □

Baltimore	2.35c-3.00c
Boston	3.10c-3.25c
Buffalo	2.95c
Chattanooga	3.00c
Cincinnati	3.00c
Cleveland	2.10c-2.25c
Detroit	2.85c
Houston	3.00c
Los Ang. cl.	2.10c
New Orleans	2.75c
Los Ang., lcl	2.40c
New York	2.65c-3.10c
Phila.	2.62½c
Pittsburgh	2.50c
San Fran. cl.	2.00c
San Fran. lcl	2.40c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES □

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	2.65c
Los Ang.	3.30c
New Orleans	3.50c
New York(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES □

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.30c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia	2.45c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE □

Baltimore*	2.80c
Boston††	2.90c-3.00c
Buffalo	3.10c-3.25c
Chattanooga	3.50c
Chicago	2.75c-2.90c
Cincinnati	3.05c
Cleveland	3.00c
Detroit	2.90c-3.05c
Houston	3.35c
Los Ang.	3.60c
New Orleans	3.25c
New York	3.00c
Portland	4.00c
Phila.*† (e)	2.70c
Pitts.**	2.65-2.90c
San Fran.	3.50c
Seattle	3.50c
St. Louis	3.00c-3.15c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK □

Balt.*†	3.50c
Boston††	3.85c
Buffalo	3.70c
Chattanooga	3.65c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c
Detroit	3.30c
Los Ang.	4.20c
New York	3.25c
Phila.*†(e)	3.15c
Pitts.**	3.35c
Portland	4.50c
San Fran.	3.90c
Seattle	4.25c
St. Louis	3.70c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS □

Balt.*†	4.00c
Buffalo	4.00c
Boston††	4.05c
Chattanooga	3.95c
Chicago	3.25c-3.50c
Cincinnati	3.55c
Cleveland	3.50c
Detroit	3.50c
Houston	3.57c
Los Ang.	4.50c
New Orleans	3.95c
New York	3.75c
Phila.*† (e)	3.50c
Pitts.**	3.85c
Portland	5.00c
San Fran.	4.55c
Seattle	4.75c
St. Louis	4.00c
St. Paul	4.19c
Tulsa	5.10c

††Base 15,000 lbs., extras on less.

†New extras apply.

†BANDS □

Baltimore	2.65c
Boston††	3.40c
Buffalo	3.30c
Chattanooga	3.20c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	2.85c
Los Ang.	3.80c
New Orleans	2.75c
New York(d)	3.30c
Philadelphia	2.75c
Pittsburgh	2.95c
Portland	3.85c
San Fran.	3.15c
Seattle	3.50c
St. Paul	3.20c
Tulsa	3.45c

†HOOPS □

Baltimore	2.65c
Boston	4.90c
Buffalo	3.95c
Chicago	3.50c
Cincinnati	3.75c
Det. No. 14 & lighter	3.65c
New York	3.30c
Philadelphia	3.00c
Pittsburgh	3.60c
Seattle	5.00c
St. Paul	3.75c

COLD FIN. STEEL □

Rounds and Hexagons

Baltimore (c)*	3.48c
Boston	3.60c
Buffalo	3.00c
Chattanooga*	3.65c
Chicago	3.00c
Cincinnati	3.32c
Cleveland	2.95c
Detroit	3.15c
Los Ang. (a)	4.25c
New York(g)	3.54c
Philadelphia	3.35c
Pittsburgh	2.95c
Portland (a)	4.50c
San Fran(d)(f)	5.55c
Seattle (a)	4.50c
St. Paul (a)	3.20c
St. Louis	3.36c
Tulsa	4.65c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted. Philadelphia, Chicago, Cleveland, Detroit.

COLD ROLL. STRIP □

Boston 0.100 in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(a) Rounds, hex. only.
(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) Bessemer analysis extras included.
‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.

Pacific Coast

Bay Bridge Contracts Under Consideration Involve Large Tonnages—Pipe Demand Heavy —Drydock and Tunnel Lining Take Large Lots of Plates—Prices Are Steady but Low

San Francisco—(*By Air Mail*)—Interest was centered around opening of bids on the major portion of the units of the San Francisco-Oakland bridge, the largest structural project ever to come up for figures on the Pacific coast. Over 140,000 tons of reinforcing bars, steel cable and structural shapes were involved. Columbia Steel Co. was low bidder on most of the work.

Reinforcing bar awards aggregated less than 500 tons. Pacific Coast Steel Corp. took 380 tons for the Boulder canyon project at Denver. Columbia Steel Co. was low on 1058 tons on one unit of the San Francisco-Oakland bridge and the Bridge Builders Inc., was low on 1160 tons for two additional units. Bids open May 3 for 1000 tons for piers and quays at Pearl Harbor, T. H. Prices remain weak at 2.00c, base, on carload lots.

Awards of plates were the largest for any week of the year. The Dravo Contracting Co., Pittsburgh, secured 2000 tons for a floating drydock for the San Diego navy yard. Consolidated Steel Corp. took 400 tons for two boilers for the General hospital, Los Angeles, and American Concrete & Steel Pipe Co. booked 250 tons of liners for the Irvington tunnel, Hetch Hetchy project, San Francisco. Bids have been opened on 2100 tons for the Moffatt tunnel, Denver, on 1000 tons for three boilers for the navy yard at San Diego and on 425 tons of 24 and 30-inch welded steel pipe for Los Angeles.

Cast iron pipe lettings were the largest of any week so far this year, totaling more than 3500 tons. The United States Pipe & Foundry Co., the American Cast Iron Pipe Co. and the National Cast Iron Pipe Co. booked 1824 tons, 912 tons and 684 tons, respectively, 8-inch pipe for Los Angeles. Bids have been postponed on 474 tons for Glendale, Calif., to March 16, and 437 tons for San Francisco until March 15 and on 138 tons for Livermore, Calif., until March 20.

Seattle More Cheerful

Seattle—While bank restrictions further narrowed the iron and steel markets this week, business sentiment is more cheerful. A feature is the firmness of the market, although at low levels. Mill prices continue steady at 2.10c for bars and shapes and 1.85c for plates.

Bethlehem Steel Co. is furnishing 400 tons of shapes and plates for a lighthouse tender by Berg Shipbuilding Co., Seattle. Isaacson Iron Works, Seattle, is doing the fabricating. This contract was previously reported taken by Barde Steel Co., Seattle. Liesch & Tofte, Marshfield, Oreg., are low bidders at $164,500 for dike and wharf projects at Sand Island, Columbia river, Oreg.

Steel in Europe

British Output Larger but Continental Trade Lags

London—(*By Cable*)—British steelmakers are believed to be negotiating domestic comptoirs and it is rumored the tariff on steel products will be increased. The Middlesbrough market is steady, with additional productive plant being restarted. Pig iron selling is improving and shipbuilding orders are expanding. Other districts are quiet. Tin plate manufacturers are working 70 per cent of capacity. The Continent and South America are placing orders.

Pig iron production in February was 270,800 tons from 63 furnaces, compared with 286,600 tons in January from 62 furnaces. The February daily average is 9671 tons, compared with 9245 tons daily average in January. Steel production was 482,700 tons in February, a gain of 38,300 tons from 444,400 tons in January.

Imports in February were 77,959 tons, compared with 148,662 tons in January, a decline of 70,703 tons, while exports in February were 135,619 tons, compared with 69,472 tons in January, a gain of 66,147 tons.

Uncertainty is reported from the Continent, owing to international complications and protracted negotiations for establishment of the steel entente. Markets are quiet and weak.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, March 16

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports	£ s d	Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	£ s d
PIG IRON				
Foundry, 2.50-3.00 Silicon	$10.15	2 18 6	$8.27	1 14 0
Basic bessemer	9.37	2 14 0*	6.57	1 7 0
Hematite, Phos. .03-.05	10.24	2 19 0	.....	.....
SEMIFINISHED STEEL				
Billets	$17.35	5 0 0	$10.22	2 2 0
Wire rods, No. 5 gage	26.03	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$26.89	7 15 0	$26.77	5 10 0
Merchant bars	1.01c	6 10 0	.51c to .52c	2 6 0 to 2 7 0
Structural shapes	1.14c	7 7 6	.47c	2 3 0
Plates, ¼ in. or 5 mm	1.32c	8 10 0	.72c	3 5 0
Sheets, black, 24 gage or 0.5 mm.	1.32c	8 10 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr.	1.63c	10 10 0	1.46c	6 12 6
Bands and strips	1.20c	7 15 0	.80c to .83c	3 12 6 to 3 15 0
Plain wire, base	1.36c	8 15 0	1.18c	5 7 6
Galvanized wire, base	1.63c	10 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	1.86c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 2.78	0 16 0	.....	.....

British ferromanganese $68 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$10.84	3 2 6 (a)	$ 8.12	205	$ 8.15	290	$16.53	69
Basic bessemer pig iron	10.24	2 19 0*(a)	6.34	160	6.32	225	18.08	75.50
Furnace coke	2.30	0 13 3	4.75	120	3.09	110	4.61	19.25
Billets	17.35	5 0 0	14.65	370	10.82	385	23.11	96.50
Standard rails	1.28c	8 5 0	1.25c	697	1.50c	1,150	1.44c	132
Merchant bars	1.05c	6 15 0	.95c	530	.65c	500	1.20c	110
Structural shapes	1.36c	8 15 0	.99c	550	.64c	490	1.17c	107.50
Plates, †¼-in. or 5 mm	1.36c	8 15 0	1.17c	650	.78c	600	1.38c	127
Sheets, black	1.47c	9 10 0‡	1.53c	850‡	.91c	700‡	1.57c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	1.82c	11 15 0	2.39c	1,325	1.87c	1,440	4.03c	370
Plain wire	1.36c	8 15 0	2.03c	1,130	1.69c	1,300	1.93c	177
Bands and strips	1.47c	9 10 0	.95c	530	.88c	675	1.38c	127

*Basic. †British ship-plates, Continental, bridge plates. ‡24 ga. ‡1 to 3 mm. basic price.
British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel.
(a) dd. Middlebrough

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 5.50c, Conn., for copper

SHEETS	
Yellow brass (high)	11.25
Copper, hot rolled	13.87½
Lead sheets, cut, to jobbers	7.00
Zinc sheets (100-lb. base)..	9.00
TUBES AND PIPES	
Seamless yellow brass (high)	13.50
Seamless copper	12.62½
RODS	
Yellow brass (high, full turning)	8.75
Naval brass	9.87½
ANODES	
Copper, untrimmed	10.75
WIRE	
Yellow brass (high)	11.25

Old Metals

Dealers' buying prices, cents lb.

NO. 1 COMPOSITION RED BRASS	
New York	2.50 to 2.75
Chicago	2.37½ to 2.62½
Cleveland	2.50 to 2.75
St. Louis	2.25
HEAVY YELLOW BRASS	
New York	1.75 to 2.00
HEAVY COPPER AND WIRE	
New York	3.87½ to 4.00
Chicago, No. 1	3.25 to 3.50
Cleveland	3.00 to 3.25
St. Louis	2.50
COMPOSITION BRASS BORINGS	
New York	2.25 to 2.50
YELLOW BRASS TUBING	
Cleveland	1.75 to 2.00
LIGHT COPPER	
New York	2.75 to 3.00
Chicago	2.37½ to 2.62½
Cleveland	2.50 to 2.75
St. Louis	2.25
LIGHT BRASS	
Chicago	1.25 to 1.50
Cleveland	1.50 to 1.75
St. Louis	1.25
LEAD	
New York	2.25 to 2.50
Cleveland	1.75 to 2.25
Chicago	2.00 to 2.25
St. Louis	2.00
ZINC	
New York	1.37½ to 1.50
Cleveland	1.12½ to 1.25
Chicago	1.12½ to 1.37½
St. Louis	1.25
ALUMINUM	
Clippings, new, soft, Cleve.	9.50 to 11.00
Clippings, hard, Cleveland	6.00 to 6.50
Borings, Cleveland	2.50 to 3.50
Mixed cast, Cleveland	4.00 to 4.50
Mixed cast, St. Louis	4.00 to 4.25

Secondary Metals

Brass ingot, 85-5-5-5	5.75
Remelt aluminum No. 12	8.00 to 9.00

Metals

Price Advances Maintained Despite Quietness — Improved Outlook for Business Aids

New York—The nonferrous metals have held recent prices advances despite quietness. This has been due to the improved confidence in the general business outlook engendered by the resumption of banking activity and a rapid succession of favorable legislative developments.

Copper—Electrolytic metal advanced to 5.75c, Connecticut, March 11 as quoted by custom smelters for delivery through June. Continued offerings of resale metal at shaded prices, however, undermined the price position of the market and on Friday some first hands were offering at 5.50c. The large mine producers remained out of the market at the nominal quotation of 6.25c. Producers of copper and brass products advanced their prices ¼-cent additionally to the basis of 5.75c for copper. Brass ingot went up ¼-cent March 11 but declined a similar amount Friday. Scrap was stronger.

Lead—Buying quieted down last week but the market continued strong despite the publication of figures showing stocks in the hands of producers at a new high. A better balance in lead is believed to be imminent in view of the increase shipments this month and proposals for further reduction of production. St. Joseph Lead Co. will shut down its Herculaneium, Mo., smelter from April 1 to Nov. 1.

Zinc—The general level of prices was higher last week with metal selling at 3.20c, East St. Louis. Some still were willing to do business on the basis of 3.15c, however. Some resale metal has been offered but a strong ore market and the reluctance of metal sellers to shade prices have combined to give the market a firmer appearance. Buying has been less active and generally for March and April shipment.

Tin—Trading was resumed Monday with the appearance of official quotations on sterling exchange. The tendency in prices was upward. The bulk of the moderate business was for prompt and nearby positions due to the wide spreads quoted on futures.

Antimony—Quotations eased somewhat during the week. Sales were in small volume.

Aluminum—Quietness ruled in the market. Prices held steady.

By-Products More Active

New York—Demand for distillates has stepped up slightly since the clearing of the banking situation, improvement being noted in spot business. The recent advance in benzol holds. Naphthalene shipments against contracts are in fair volume and spot business has gained. Sulphate of ammonia holds its recent seasonal activity.

Coke By-Products

	Spot
Per Gallon, Producers' Plants, Tank Lots	
Pure benzol	$0.22
90 per cent benzol	0.22
Toluol	0.30
Solvent naphtha	0.26
Comercial xylol	0.26
Per Pound at Producers' Plants in 250-Pounds Drums	
Phenol	0.153 to 0.173
Per Pound at Producers' Plants	
Naphthalene flakes	4.75 to 5.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.10

Quicksilver Active

New York — Quicksilver prices again are firmer with round lots quoted $53.50, a virgin flask of 76 pounds, and small lots at $54.50 a flask. Demand is active.

Nonferrous Metal Prices of the Week, Cents a Pound

Spot unless otherwise specified

	Copper			Straits Tin		Lead	Lead	Zinc	Aluminum	Antimony	Ingot
	Electro., del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	New York Futures	N. Y.	East St. L.	St. L.	98-99%	Spot, N. Y.	Nickel
March 11	5.75	5.87½	5.50	*.....	*.....	3.35	3.22½	3.12½	22.90	6.25	35.00
March 13	5.75	5.87½	5.50	24.00	24.45	3.35	3.22½	3.15	22.90	6.25	35.00
March 14	5.75	5.87½	5.50	24.25	25.00	3.35	3.22½	3.15	22.90	6.00	35.00
March 15	5.75	5.87½	5.50	24.40	24.85	3.35	3.22½	3.15	22.90	6.00	35.00
March 16	5.75	5.87½	5.50	24.55	24.95	3.35	3.22½	3.20	22.90	5.87½	35.00
March 17	5.50	5.87½	5.25	24.35	24.60	3.35	3.22½	3.15	22.90	5.87½	35.00

*Bank holiday. Sterling exchange trading suspended.

Here and There in Industry

LEONARD, J. BUCK INC., 74 Trinity place, New York, has been appointed exclusive agent of the St. Lawrence Corp. of Newfoundland, Ltd., in the sale of fluorspar in the United States and Canada. The properties of the St. Lawrence corporation are situated on the South coast of Newfoundland directly on tidewater at Great St. Lawrence and Little St. Lawrence bays, with cargo boat time to the principal points of arrival along the Atlantic in this country from four to six days.

Fluorspar of all grades, it was said, will be available for delivery during the early spring of the present year and continually thereafter during both the summer and winter months, as the harbor in Newfoundland does not freeze.

□ □ □

Superior Steel Corp., Pittsburgh, has appointed Horace T. Potts Co., Philadelphia, warehouse representative for the sale of its rust resisting strip steel.

□ □ □

Northern Equipment Co., Erie, Pa., has appointed the J. W. Murphy Co., 431 South Dearborn street, Chicago, its district representative for sale of feed water regulators, differential valves, pump governors and allied equipment.

□ □ □

Associate Engineers Inc., 1233 East 144th street, East Cleveland, O., has been formed and incorporated to do a consulting and contracting business, to prepare plans and specifications for machinery, buildings and foundations. J. H. Gleason is president, George P. Webster secretary, and W. Finter treasurer.

□ □ □

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has co-ordinated the various sales and engineering departments involved in aviation activities in the transportation sales department under direction of M. B. Lambert, sales manager. A. P. Schrader will directly supervise the headquarters organization. Almost every phase of aviation is served by this department and centralization is designed to improve service.

□ □ □

Capitol Steel Corp., New York, fabricator of reinforcing steel products for concrete work, has opened a branch office at 253 South Fifty-third street, Philadelphia. It will be in charge of E. B. Van Hook, district manager, for the last two and one-half years chief engineer in the company's New York office. Prior to that he was engineer at the Philadelphia offices of Truscon Steel Co. and Kalman Steel Corp. All purchasing will be done by the New York office.

□ □ □

B. F. Goodrich Rubber Co., Akron, O., has appointed Lucien Q. Moffitt Inc., Peoples Bank building, Akron, O., exclusive distributor of Goodrich cutless rubber bearings in the United States and Canada. The new distributor company is headed by Lucien Q. Moffitt, who has been manager of the cutless rubber bearing department of the Goodrich company since this device was put on the market several years ago. His associates have been employed in the Goodrich offices.

□ □ □

Chain Belt Co., Milwaukee, manufacturer of construction equipment, has appointed Ginsberg, Barnes & Conway Co. Inc., 355 Walton avenue, New York, its exclusive distributor in New York state south of and including Sullivan, Ulster and Dutchess counties, Greater New York and Long Island. The firm is composed of Frank Ginsberg, Don Barnes, Jack Conway and Bob Campello, all experienced in construction equipment machinery business, who have organized to give expert professional service to contractors.

□ □ □

L. J. Mueller Furnace Co., Milwaukee, manufacturer of hot water and warm air heating equipment, has entered into an arrangement with the Frigidaire Corp. Dayton, O., subsidiary of General Motors, for distribution of an all-year air conditioning equipment. The Mueller company will provide Frigidaire its standard line of heating equipment and in turn will merchandise the latter's air conditioning equipment through its national sales organization. No change in financial control is involved.

□ □ □

Globe-Union Mfg. Co., Milwaukee, manufacturer of storage batteries, radio parts, roller skates, golf clubs and other products, has placed orders for 500 carloads of material, according to announcement by its president, Chester O. Wanvig. Delivery is to be to the company's five plants at Milwaukee, Philadelphia, Cincinnati, Memphis, Tenn., and Seattle. Production of all plants in February exceeded that of the same month in 1932. A 10 per cent increase in hourly wages has been made, retroactive to Feb. 27.

ROLLING MILL EQUIPMENT

United has developed a large part of the machinery that has made the rolling practice of the industry what it is today. Now, after years of developing for speed and quality production, the demand has changed.

Quality is the key word in every policy, in every sales effort, in every advertising copy. The operator is scrutinizing his equipment to find where the change can be made to improve his finished product. This is where United can serve.

Leaders in our chosen field, constantly in touch with all the problems in all sections of the country on all metals, both ferrous and non-ferrous, we are in an ideal position to lead in the new era.

UNITED

ENGINEERING *and* FOUNDRY COMPANY

PITTSBURGH — PENNSYLVANIA

STATISTICS OF IRON AND STEEL INDUSTRY

Compiled by department of commerce, except: Unfilled tonnage by United States Steel Corp.; foundry equipment orders by Foundry Equipment Manufacturers association; river traffic by United States engineer at Pittsburgh; electric power by department of interior, geological survey

Automobiles

Units Production

1932	—United States— Total*	Passenger cars	Canada Total
Jan.	119,344	98,706	3,731
Feb.	117,413	94,085	5,477
Mar.	118,959	99,325	8,318
April	148,326	120,906	6,810
May	184,295	151,683	8,221
June	183,106	160,103	7,112
July	109,143	94,678	7,472
Aug.	90,325	75,898	4,067
Sept.	84,150	64,735	2,342
Oct.	48,702	35,102	2,923
Nov.	59,557	47,293	2,204
Dec.	107,353	85,858	2,139
Year	1,370,678	1,134,372	60,816
1933			
Jan.	130,114	108,392	3,358

*Difference of total and passenger cars equals number of trucks. †Average monthly shipments, 1922-23-24 taken as 100.
‡Figures by American Institute of Steel Construction, 75 per cent of industry reporting.

Fabricated Shapes

Net Tons

	Bookings Tonnage	Per cent of capacity	Shipments Tonnage	Per cent of capacity
Jan.	48,400	12.1	65,600	16.4
Feb.	62,000	15.5	78,000	19.5
Mar.	64,400	16.1	82,400	20.6
April	64,800	16.2	68,400	17.1
May	90,800	22.7	72,400	18.1
June	86,800	21.7	83,200	20.8
July	69,200	17.3	83,600	20.9
Aug.	78,800	19.7	85,600	21.4
Sept.	111,200	27.8	90,800	22.7
Oct.	74,400	18.6	86,400	21.6
Nov.	51,600	12.9	76,000	19.0
Dec.	145,600	36.4	68,800	17.2
Year	948,000	19.8	942,400	19.6
1933				
Jan.	†72,251	....	49,185	....

Fabricated Plates

Net Tons Bookings

	Total	Oil Storage Tanks	Miscellaneous
Jan.	17,613	4,783	12,124
Feb.	17,755	4,115	11,777
Mar.	12,564	1,161	10,022
April	14,074	1,406	11,167
May	11,788	2,310	9,356
June	18,383	2,808	10,209
July	12,485	3,661	6,586
Aug.	11,916	4,394	6,911
Sept.	11,013	3,753	6,801
Oct.	16,737	5,941	9,528
Nov.	7,873	1,446	6,065
Dec.	9,510	3,154	5,534
Year	161,810	38,976	109,085
1933			
Jan.	11,128	1,501	8,830

Railroad Locomotives

Units Shipments

	Domestic	Foreign
Jan.	..	..
Feb.	1	4
Mar.	..	3
April	8	..
May	13	2
June	17	..
July	9	..
Aug.	9	..
Sept.	9	4
Oct.	10	2
Nov.	8	..
Dec.	6	..
Year	80	15
1933		
Jan.	2	..

Foundry Equipment Order Index†

Jan.	20.5
Feb.	27.6
Mar.	27.5
April	13.7
May	18.0
June	14.2
July	18.7
Aug.	18.6
Sept.	11.9
Oct.	23.2
Nov.	11.5
Dec.	16.5
Year	....
1933	
Jan.	68.4

†Average monthly shipments, 1922-23-24 taken as 100.

Malleable Castings

Net Tons

1932	Output	Shipments	Orders booked
Jan.	20,399	19,658	20,332
Feb.	19,834	19,432	17,808
March	17,844	19,392	16,235
April	15,461	16,847	16,185
May	16,597	18,075	16,463
June	15,018	16,450	13,330
July	9,447	11,359	8,658
August	6,804	8,631	7,776
Sept.	10,051	9,746	10,582
Oct.	12,274	11,615	12,850
Nov.	13,622	12,745	14,304
Dec.	14,128	14,366	14,504
Year	171,479	178,316	169,027
1933			
Jan.	12,402	14,077	12,220

Steel Castings

Net Tons

	Total bookings	Total production
Jan.	17,393	18,395
Feb.	17,015	18,759
March	16,593	20,433
April	12,801	17,474
May	11,342	14,463
June	12,765	12,839
July	9,301	11,460
August	10,147	12,331
Sept.	11,883	11,337
Oct.	11,896	12,480
Nov.	13,235	13,712
Dec.	13,283	13,886
Year	155,837	175,831
1933		
Jan.	12,464	13,603

Mechanical Stokers

—Sales—

	Fire tube boilers	Water tube boilers
Jan.	70	45
Feb.	63	26
March	60	23
April	80	15
May	41	30
June	65	48
July	70	44
August	99	38
Sept.	117	46
Oct.	96	21
Nov.	79	12
Dec.	78	20
Year	920	367
1933		
Jan.	50	13

Steel Furniture

Dollars, 000 omitted

	Business shipments	Shelving, shipments
Jan.	977	269
Feb.	807	229
March	780	259
April	753	190
May	653	196
June	671	177
July	521	155
August	543	141
Sept.	577	146
Oct.	622	142
Nov.	581	125
Dec.	610	135
Year	8,102	2,166
1933		
Jan.	582	121

Babbitt Metal

Pounds 000 omitted

	(a) Total production	(b) Sales
Jan.	1,743	1,281
Feb.	1,577	1,142
March	1,595	1,188
April	1,419	1,060
May	1,345	947
June	1,319	858
July	1,275	870
August	1,319	994
Sept.	1,406	1,108
Oct.	1,573	1,192
Nov.	1,265	944
Dec.	1,149	823
Year	16,990	12,412
1933		
Jan.	1,346	1,073

(a) by 40 plants. (b) by 30 manufacturers who produce for sale, including 5 who also report consumption of own metal.

Unfilled Tonnage

Tons United States Steel Corp.

1932	Unfilled orders	Net change	Per cent change
Jan.	2,648,150	87,203—	3.19—
Feb.	2,545,629	102,521—	3.88—
March	2,472,413	73,216—	2.87—
April	2,326,926	145,487—	5.88—
May	2,177,162	149,764—	6.44—
June	2,034,768	142,394—	6.54—
July	1,965,302	68,465—	3.36—
Aug.	1,969,595	3,293+	0.16+
Sept.	1,985,090	15,495+	0.78+
Oct.	1,977,040	11,950+	0.62+
Nov.	1,968,301	28,739—	1.45—
Dec.	1,958,140	161—	0.01—
Year	.....	...	.....
1933			
Jan.	1,898,644	69,495—	3.5—
Feb.	1,854,200	44,444—	2.3—

*For public use.

Electric Power

Millions Kilowatt Hours

1932	Production*
Jan.	7,543
Feb.	7,002
March	7,302
April	6,779
May	6,635
June	6,549
July	6,526
Aug.	6,743
Sept.	6,735
Oct.	7,054
Nov.	6,939
Dec.	7,127
Year	82,939
1933	
Jan.	6,900

Coke

Net Tons Production

	By-Product	Beehive
Jan.	2,100,923	87,900
Feb.	1,995,780	85,800
March	2,089,391	87,400
April	1,883,391	56,000
May	1,742,517	45,000
June	1,536,712	41,200
July	1,523,422	38,200
Aug.	1,473,904	40,700
Sept.	1,544,491	45,700
Oct.	1,738,716	67,600
Nov.	1,751,581	81,400
Dec.	1,785,035	95,600
Year	21,165,913	772,500
1933		
Jan.	2,100,923	87,900

Steel Barrels

Units

	Production	Shipments
Jan.	359,685	352,135
Feb.	367,472	369,882
March	452,294	453,621
April	447,379	452,191
May	427,299	425,662
June	651,916	654,561
July	352,614	353,336
Aug.	362,993	360,509
Sept.	395,640	398,241
Oct.	422,637	417,490
Nov.	373,190	376,647
Dec.	309,570	307,372
Year	4,920,117	4,928,307
1933		
Jan.	292,291	292,609

River Traffic

Net Tons

	Allegheny	Monongahela	Ohio
Jan.	.....	25,327	45,199
Feb.	2,200	20,089	40,737
March	550	32,234	33,254
April	501	23,849	32,972
May	2,550	23,941	28,267
June	3,611	18,291	27,305
July	1,400	13,677	22,895
Aug.	3,400	26,390	43,621
Sept.	1,200	18,831	28,557
Oct.	21,280	24,305	40,399
Nov.	23,225	29,851	45,735
Dec.	7,200	28,169	30,048
Year	67,117	284,954	418,990
1933			
Jan.	1,627	11,734	18,002
Feb.	1,656	17,904	23,614

Construction and Enterprise

New England

LOWELL, MASS.—American Hide & Leather Co. is having plans made for a powerhouse for its tannery, to cost about $80,000.

New York

JAMESTOWN, N. Y.—Jamestown Metal Desk Co. has received a large order for desks for the new building to be erected at the Gowanda, N. Y., state hospital in its $3,000,000 building project.

OGDENSBURG, N. Y.—P. H. Fitzgibbons Boiler works was damaged about $50,000 by a recent fire.

ROCHESTER, N. Y.—S. B. Roby Co. suffered loss of about $250,000 by fire in its warehouse recently.

SYRACUSE, N. Y.—F. Creamer, 108 South State street, plans a sheet metal shop, costing over $28,000 with equipment.

New Jersey

NEWARK, N. J.—New Jersey Gear & Mfg. Co. has been incorporated with $125,000 capital to manufacture gears and tools, by Tumarkin & Kasen, 60 Park place, Newark, N. J.

Pennsylvania

ERIE, PA.—Lake View Forge & Clevice Co. has been incorporated with $20,000 capital to manufacture drop forgings, by George C. Miller, 1400 Powell avenue, Erie, Pa.

PHILADELPHIA—R. E. Coulburn & Co. Inc. has been incorporated with $15,000 capital to deal in and erect structural and reinforcing steel, by Roland E. Coulborn, Haddonfield, N. J.

PHILADELPHIA—Harry F. Brown Inc. has been incorporated with $5000 capital to manufacture patterns for castings and models, by Harry F. Brown, 409 Jericho road, Abington, Pa.

Ohio

AKRON, O.—Wright's Welding Shop Inc. has been incorporated with 250 shares no par value, by Paul G. Russell, 1009 Akron Savings & Loan building, Akron, O.

CLEVELAND—Steel Age Business Furniture Inc. has been incorporated with 250 shares no par value by William C. Keough, City Bank building, Cleveland.

DAYTON, O.—General Tool & Engineering Co. plant was damaged about $15,000 by fire recently.

Michigan

DETROIT—Oakland Junk Inc. has been incorporated with $10,000 capital to deal in and smelt metals, by Sam Schoichet, 1534 Gillette street, Detroit.

DETROIT—Anchor Steel & Conveyor Co., 2563 Bellevue street, has been incorporated with $12,000 capital to manufacture machinery, by Gerret Waalkes, 82 Grove avenue, Detroit.

DETROIT—Michigan Casket Co. has been incorporated with $50,000 capital to manufacture caskets, by Carl Borchard, 1235 Rivard street, Detroit.

MIDLAND, MICH.—City is considering construction of a municipal electric light and power plant, including generating plant and distribution system, to cost about $70,000.

Illinois

AURORA, ILL.—Piston Expander Co. of Illinois, 519 Loucks street, has been incorporated with 700 shares no par value to manufacture automotive parts, by Plain & Plain, First National Bank building, Chicago.

CHICAGO—United Iron & Wire Co., 3715 South St. Louis avenue, has been incorporated with $50,000 capital, by Samuel and Meyer Brownstein, 3715 South St. Louis avenue, Chicago.

CHICAGO—Federal Highway Markers Inc., 360 North Michigan avenue, room 711, has been incorporated with $40,000 capital to do a highway advertising business, by J. Edward Williams, 130 South Clark street, Chicago.

Southern States

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids as follows: March 28, schedule 9797, one motor-driven rotary shear, for Brooklyn, N. Y.; schedule 9769, one motor-driven horizontal boring, drilling and milling machine, for Philadelphia; March 21, schedule 9729, one motor-driven heavy duty emery grinder; schedule 9735, one motor-driven diamond boring machine.

Missouri

KENNETT, MO.—An election will be held April 4 on a bond issue of $30,000 for a sewage disposal plant and equipment. T. H. Allen, 65 McCall building, Memphis, Tenn., is engineer.

ST. CHARLES, MO.—Council is financing an electric light and power plant to cost $300,000 on plans by Russel & Axon, Roosevelt building, St. Louis, consulting engineers.

Oklahoma

OKLAHOMA CITY, OKLA.—Anglo Refining Co. has been incorporated with $5000 capital to operate an oil refinery, by M. J. Baze, 2554 Northwest Twenty-third street.

OKLAHOMA CITY, OKLA.—Metal Products Co., H. E. Stewart manager, has established a plant at 513 North Indiana street to manufacture heavy sheet metal products and culverts.

Texas

DALLAS, TEX.—Channel Transport & Marketing Co., Clint W. Murchison, 701 Browder street, president, plans construction of an 8-inch oil pipeline from the Conroe field to the Houston ship channel, 35 miles. Plans include a main line pumping station equipped with electrically-driven centrifugal pumps.

HOUSTON, TEX.—Chicago Bridge & Iron Works, Chicago, has been awarded a contract by the Sinclair Refining Co. for four 80,000-barrel storage tanks to be erected at its Houston refinery.

Wisconsin

MILWAUKEE — Milwaukee Saw Trimmer Corp. has been organized to manufacture saw trimmers and other specialized equipment for printing plants. Headquarters have been established at 612 East Clybourn street. Fred W. Billker is president and general manager.

MILWAUKEE—Columbia Steel Co., Torrance, Calif., has placed an order with the L. J. Mueller Furnace Co., Milwaukee, for five batteries of 11 steel furnaces each, to be used for prevention of rust on finished steel sheets for automobile bodies.

TWO RIVERS, WIS.—Denmark Motor Device & Engineering Co. manufacturer of carburetors and other automotive specialties, has been given a three-year lease by the city on the old Roosevelt school building and will convert it into a factory for immediate occupancy. J. V. Dearmann is president.

Wyoming

GREYBULL, WYO.—Grey Oil & Refining Co., J. A. Alderdice, Greybull, Wyo., manager, plans construction of a small oil refinery here.

NEW CASTLE, WYO.—Eclipse Refining Co. has plans for an addition to its refinery, to cost about $30,000.

Montana

KALISPELL, MONT.—A Reconstruction Finance Corp. loan of $34,000 has been granted for waterworks improvements. A. L. Jaquett is city engineer.

Idaho

CALDWELL, IDAHO—Caldwell Refining Co. plans construction of an oil refinery estimated to cost about $150,000.

Pacific Coast

ALAMEDA, CALIF.—Ford, Bacon & Davis Inc., engineer, 58 Sutter street San Francisco, has been retained to make a survey for a municipal power plant to cost about $1,000,000.

PORTLAND, OREG.—Hawley Pulp & Paper Co. has awarded to George H. Buckler Co., Lewis building, a contract for steel and wood flumes and conveyors at its plant at Oregon City, Oreg.

KETCHIKAN, ALASKA—Bids will be taken soon by superintendent of lighthouses for furnishing two diesel engine-driven compressors for the Cape Hinchinbrook lighthouse, Alaska.

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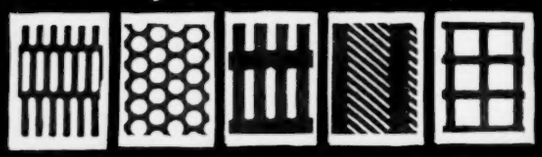

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